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Aerospace Medicine and Biology
A Continuing Bibliography with Indexes

NASA SP-7011(277)
November 1985

Aerospace Medicine & Biology

ACCESSION NUMBER RANGES

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STAR (N-10000 Series)	N85-29910 – N85-32088
IAA (A-10000 Series)	A85-39961 – A85-43292

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NASA SP-7011(277)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 277)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in October 1985 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* lists 205 reports, articles and other documents announced during October 1985 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA).* The first issue of the bibliography was published in July 1964.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space References describing similar effects of biological organisms of lower order are also included Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract The listing of the entries is arranged by *STAR* categories 51 through 55, the Life Sciences division The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals The *IAA* items will precede the *STAR* items within each category.

Seven indexes -- subject, personal author, corporate source, foreign technology, contract, report number, and accession number -- are included

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1985 Supplements

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PUBLIC COLLECTIONS OF NASA DOCUMENTS

DOMESTIC: NASA and NASA-sponsored documents and a large number of aerospace publications are available to the public for reference purposes at the library maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019

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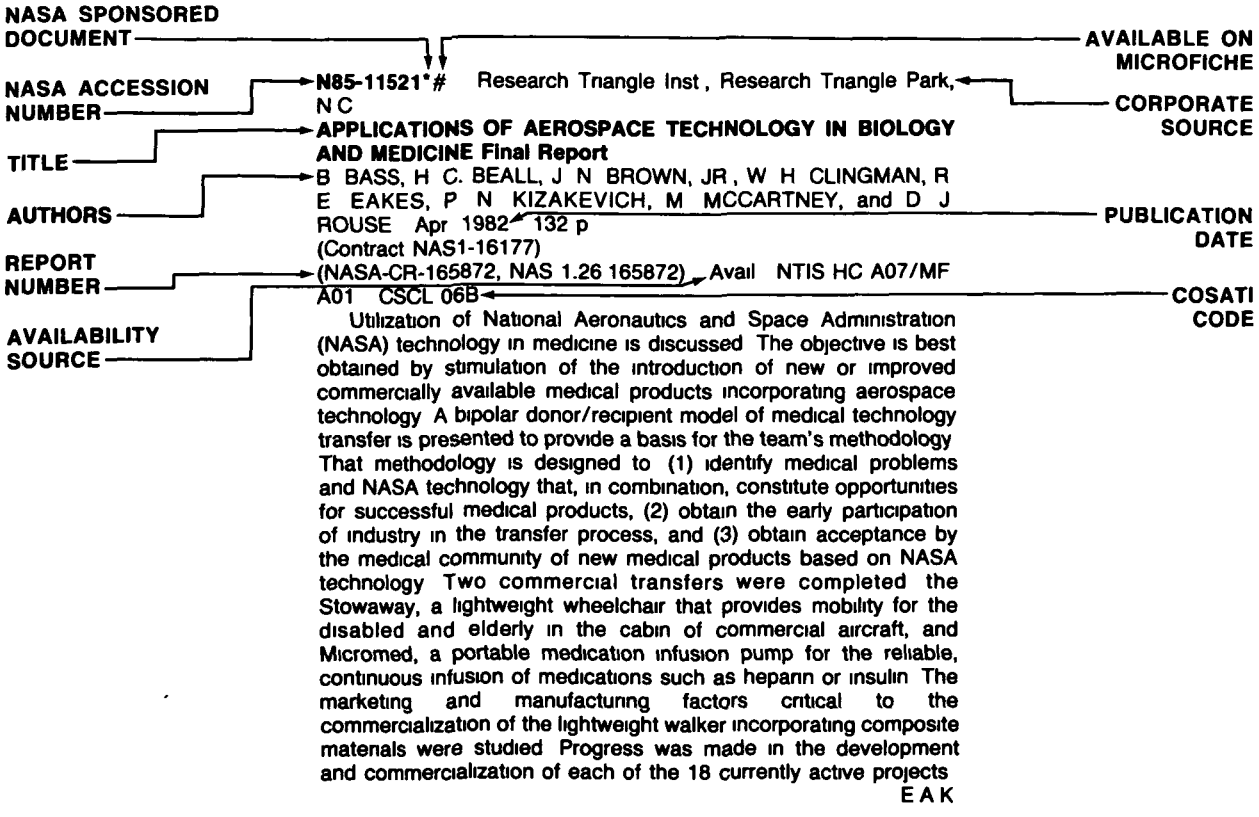

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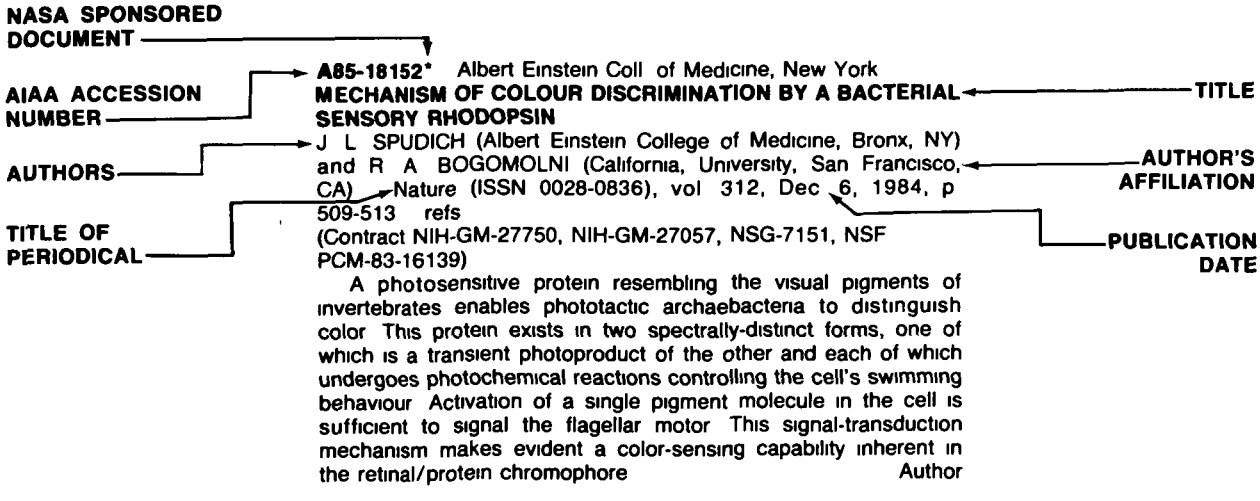

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 277)

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LIFE SCIENCES (GENERAL)

Includes genetics

A85-41484* Wisconsin Univ., Madison
GENETICS OF RESISTANCE TO THE AFRICAN TRYPANOSOMES. V QUALITATIVE AND QUANTITATIVE DIFFERENCES IN INTERFERON PRODUCTION AMONG SUSCEPTIBLE AND RESISTANT MOUSE STRAINS
A. L. W. DE GEE, J. M. MANSFIELD (Wisconsin, University, Madison), and G. SONNENFELD (Louisville, University, KY) Journal of Immunology (ISSN 0022-1767), vol. 134, April 1985, p. 2723-2726. refs
(Contract NIH-AI-22441, NCC2-213)

A85-41641
FREE, GLUCURONIDE, AND SULFATE CATECHOLAMINES IN THE RAT EFFECT OF HYPOXIA
J. CLAUSTRE, R. FAVRE, J. M. COTTET-EMARD, and L. PEYRIN (Lyon I, Universite, France) Journal of Applied Physiology (ISSN 0161-7567), vol. 59, July 1985, p. 12-17. refs

Results are reported from experiments to determine which conjugated catecholamine, either sulfate (SC) or glucuronide (GC), is more efficiently synthesized and released in rat plasma after catecholaminergic stimulation. Exteriorized catheters were used to obtain blood samples from rats subjected to hypoxic conditions. The samples were taken at 15 min, 1 and 4 hr after introduction to hypoxia and 1 and 20 hr after returning to normoxia. Urinary samples were also collected to determine the relative excretion rates of the conjugates and to see if the urinary rates correlated with the plasma rates. The GC decreased 25 percent in hypoxia, while SC was only mildly affected. It is hypothesized, therefore, that GC might supply a conjugated catecholamine precursor. The urinary outputs had low correlations with plasma conjugate levels, a factor which identified the kidney as the main organ for deconjugation. M.S.K.

A85-41643
HYPOXIA-INDUCED ACTIVATION IN SMALL ISOLATED PULMONARY ARTERIES FROM THE CAT
J. A. MADDEN, C. A. DAWSON, and D. R. HARDER (Wisconsin, Medical College, U.S. Veterans Administration, Medical Center, Wood) Journal of Applied Physiology (ISSN 0161-7567), vol. 59, July 1985, p. 113-118. Research supported by the U.S. Veterans Administration. refs
(Contract NIH-HL-31871)

Responses of the mechanical force (MF) and membrane potential (MP) in isolated pulmonary arteries of cats experiencing hypoxic conditions were examined experimentally. The study was performed to further the understanding of the vasoconstrictor response often observed in hypoxic conditions. Arteries were removed from the lungs of anesthetized cats, threaded with tungsten wires to measure the MF development, and placed in a sealed chamber whose oxygen partial pressure (PO_2) could be controlled while the tissue floated in a saline solution. Phentolamine or indomethacin were also added once responses to specified PO_2 levels were recorded in order to examine the effects of an alpha-adrenergic receptor blockade and cyclooxygenase inhibition. Depolarization was observed in smaller, but not larger, arteries at PO_2s from 350-300 Torr. A 0.001 M dose of indomethacin blocked the constriction, but phentolamine did not. The data indicate constriction control is mediated by substances in the arterial walls. M.S.K.

A85-42056
HYPERTENSION INDUCED BY REPEATED EXPOSURE TO HIGH SUSTAINED +GZ (HS + GZ) STRESS
P. BORREDON, F. PAILLARD, P. LISCIA, and C. NOGUES (Centre d'Etudes et de Recherches de Medecine Aerospatiale, Paris, France) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, April 1985, p. 328-332. refs
(Contract DRET 81-1015)

The effects on cardiovascular function of restraint and centrifugation at 8-9 +Gz for 3 x 40 s three times/wk for 3-6 wks or restraint for the same periods without centrifugation are investigated experimentally in male brown rabbits. The results are presented in table and graphs and characterized. In the centrifuged rabbits, systolic arterial pressure (SAP), left-ventricular pressure (LVP), systemic diastolic AP, and the maximum rate of increase of LVP are all significantly higher than in uncentrifuged unrestrained controls, and the myocardium is found to be significantly glycogen depleted. In the rabbits subjected to restraint alone, only SAP and LVP are elevated. The implications for the development of hypertension in humans subjected to repeated high sustained +Gz are discussed. T.K.

A85-42057
FLUID REPLACEMENT DURING HYPOTHERMIA
D. E. ROBERTS, J. C. BARR, D. KERR, C. MURRAY, and R. HARRIS (U.S. Army, Research Institute of Environmental Medicine, Natick, MA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, April 1985, p. 333-337. refs

The cardiovascular effects of saline infusion (20 percent of plasma volume over 10 min) in mixed-breed splenectomized adult dogs anesthetized with pentobarbitol, cooled to 25 C at 3 C/h, held at 25 C for 2 h, infused, held for 4 h, and rewarmed at 3 C/h are investigated experimentally, in a second group, the infusion is given immediately prior to the beginning of rewarming, while controls receive no saline infusion and remain hypovolemic due to the hypothermia. The results are presented in tables and graphs and characterized. Hematocrit values are found to be unaffected by saline infusion, while infusion after 2 h at 25 C produces an increase in the cardiac output (relative to controls or the second group) during the rest of the hypothermic period and rewarming. Cardiac output in all three groups remains depressed (relative to precooling values) even after rewarming. The implications for the treatment of human accidental hypothermia are considered. T.K.

A85-42058* Michigan Univ , Ann Arbor
ANATOMIC EVIDENCE FOR PERIPHERAL NEURAL PROCESSING IN MAMMALIAN GRAVICEPTORS
M D ROSS (Michigan, University, Ann Arbor) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, April 1985, p 338-343 refs
(Contract NAS2-10535, NSG-9047)

Ultrastructural study of utricular and saccular maculas demonstrates that their innervation patterns are complex There is a clustering of type I and type II hair cells based upon a sharing of afferents, a system of efferent-type beaded fibers that is of intramacular (mostly calyceal) origin, and a plexus-like arrangement of afferents and efferents at many sites in the neuroepithelium Results suggest that information concerning linear acceleration is processed peripherally, beginning at the hair cell level, before being sent to the central nervous system The findings may supply a structural basis for peripheral adaptation to a constant stimulus, and for lateral inhibition to improve signal relative to noise
Author

A85-42061
USE OF RU 25960, A NEW CALCIUM ANTAGONIST, IN NORMOBARIC AND HYPOBARIC HYPOXIA
C SALIGAUT, N MOORE, M CHADELAUD, M DAOUST, P CHRETIEN (Rouen, Universite, Saint-Etienne du Rouvray, France) et al Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, April 1985, p 358-361 Research supported by Houde-ISH Laboratoires refs

RU 25960 - 3-(Bis/3,3-diphenylpropyl/-amino)-propan-1-ol hydrochloride - a vasodilator with calcium antagonist properties, was tested on learning in hypobaric hypoxic rats and survival time in normobaric hypoxic mice It decreased learning in hypobaric hypoxia, but did not change survival time in mice This suggests (1) that the mechanisms underlying learning and survival are not the same, and (2) that like other calcium antagonists, RU 25960 has no protective effect against the deleterious effects of hypoxia on the brain
Author

A85-42062
CHANGES IN THE SERUM LDH ISOENZYMES IN MONKEY DURING CHRONIC EXPOSURE TO SIMULATED HIGH ALTITUDE
H OSADA and A NAKAMURA (Air Self-Defense Force, Aeromedical Laboratory, Tokyo, Japan) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, April 1985, p 362-366 refs

When the monkey was exposed to a simulated high altitude of 18,000 ft (5,486 m) for 30 d, the serum LDH activity was increased to its maximum in 1 week After the monkey returned to sea level, the enzyme activity showed a rapid recovery On the basis of electrophoretic analysis of LDH isoenzymes, the percentages of LDH-1 and LDH-2 were decreased during the first 2-3 weeks of hypoxic exposure whereas those of LDH-3, LDH-4 and LDH-5 were increased After 2 or 3 weeks of hypoxic exposure, LDH-3, LDH-4, and LDH-5 became predominant, indicating that the isoenzyme pattern shifted to an anaerobic form from an aerobic form These results clearly showed that relative proportions of the five isoenzymes were significantly altered by chronic hypoxia of high altitude and that the elevation of total serum LDH activity induced by hypoxia came predominantly from rapid accumulation of M type LDH isoenzymes in serum
Author

A85-42067* National Aeronautics and Space Administration Ames Research Center, Moffett Field, Calif
HYPERGRAVITY INDUCED PROLACTIN SURGE IN FEMALE RATS
E MEGORY and J OYAMA (NASA, Ames Research Center, Moffett Field, CA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, May 1985, p 415-418 refs

Acute initial exposure to hypergravity (HG) was previously found to induce prolonged diestrous in rats, which was followed by return to normal estrous cycling upon more prolonged exposure to continuous HG Bromergocryptine was found to prevent this prolonged diestrous In this study it is found that in female rats 20 h of 3 14 G exposure (D-1 1200 h until D-2 0800 h) can induce prolactin surge at D-2 1600 h Shorter exposure time (8 h), or exposure during a different part of the estrous cycle (19 h from D-1 0700 h until D-2 0200 h) could not elicit this prolactin surge Similar exposure of male rats of HG did not alter significantly their prolactin levels It is possible that the hypothalamus of male and female rats responds differently to stimulation by HG
Author

A85-42068* Northrop Services, Inc , Houston, Tex
REGULATION OF HEMATOPOIESIS IN RATS EXPOSED TO ANTIORTHOSTATIC, HYPOKINETIC/HYPODYNAMIA. I - MODEL DESCRIPTION
C D R DUNN, P C JOHNSON, R D LANGE, L PEREZ, and R NESSEL (Northrop Services, Inc , Life Sciences Laboratory, Baylor College of Medicine, NASA, Johnson Space Center, Houston, TX, Tennessee, University, Knoxville) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, May 1985, p 419-426 refs
(Contract NAGW-308, NAS9-14525, NAS2-10801, NAS2-11586, NAS9-14662)

The effect of a 7-day suspension in a jacket and harness with 20-deg head-down tilt on body weight, food and water consumption, and hematological parameters is investigated experimentally in male Sprague-Dawley rats weighing 150-175 g The results are presented in graphs and compared with those for unsuspended controls and with published data on rats and humans exposed to microgravity in space flight Suspended rats are found to have reduced red-blood-cell mass, erythropoiesis, plasma volume (leading to temporarily increased hematocrit), body weight, and food and water consumption, rightward-shifted oxyhemoglobin-dissociation curves, and unchanged platelet count, leucocyte count or PHA reactivity, and red-blood-cell shape distribution Since many of these effects are also seen in space flight, the present experimental model is considered a promising technique for simulating the hematopoietic effects of microgravity at 1 g
T K

A85-42069* Beth Israel Medical Center, N Y
INCREASE OF PLASMA RENIN ACTIVITY IN MALE AND FEMALE RABBITS SUBJECTED TO DYSBARIC CONDITIONS
C CHRYSSANTHOU, H KIRCIKOGLU, and J STRUGAR (Beth Israel Medical Center, New York, New York, City University, NY) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, May 1985, p 427-430 refs
(Contract NAGW-470)

The renin-angiotensin-aldosterone system may be implicated in hemodynamic alterations occurring in dysbaric disorders This report concerns changes in plasma renin activity (PRA) induced by exposure of rabbits to a compression-decompression schedule that does not normally produce clinical manifestations of decompression sickness The results revealed a significant increase in PRA in 19 of 23 animals following dysbaric exposure Mean PRA rose from 1 18 ng ang l/ml hr (preexposure) to 2 40 ng ang l/ml hr (postexposure) The increase was particularly pronounced in female animals (217 percent) Asymptomatic intravascular gas bubbles (silent bubbles) were detected by gross or microscopic examination in the majority of the animals Renin elaboration and secretion in asymptomatic dysbaric exposures may be mediated by bradykinin and/or prostaglandins released or activated in a chain reaction triggered by silent gas bubbles This hypothesis is also applicable to increased PRA in altitude decompression Alternatively elevation of PRA may result from decreased renal perfusion when dysbaric disorders are complicated by significant hypovolemia
Author

A85-42070
HEMODILUTION DURING STANDARDIZED HEMORRHAGE IN HIGH-ALTITUDE ACCLIMATIZED RATS
P CHERDRUNGSI (Mahidol University, Bangkok, Thailand) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, May 1985, p 431-435 Research supported by the Rockefeller Foundation and National Research Council of Thailand refs

Ten control rats and sixteen high-altitude acclimatized rats were bled at sea level into a reservoir which maintained arterial pressure at 35 mm Hg As soon as the animals had spontaneously taken back 30 percent of the maximum bleeding volume, all the shed blood remaining in the reservoir was reinfused Hemodilution was studied during the first half phase of hypotension starting from the point of initial blood withdrawal and ending at the point of maximum blood loss Changes in hematocrit, hemoglobin content, total plasma protein, and arterial plasma osmolality were measured The initial and the maximum blood withdrawal, the oligemic time, and the survival time of the altitude-acclimatized rats were all greater than those for non-acclimatized rats The higher tolerance to standardized hemorrhagic shock in altitude-exposed rats seemed to be due in part to their more marked hemodilution which allowed more efficient homeostatic regulation of vascular volume. The difference in rate of hemodilution between the two animal groups could not be attributed to arterial hyperosmolality Author

A85-42076* Wright State Univ , Dayton, Ohio
A STIMULATOR FOR LABORATORY STUDIES OF MOTION SICKNESS IN CATS
G H CRAMPTON and J B LUCOT (Wright State University, Dayton, OH) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, May 1985, p 462-465 refs
(Contract NCC2-229)

A motion sickness device is described which produces motion sickness in about 40 percent of an unselected population of unrestrained female cats during a 30-min exposure at 0 28 Hz The apparatus provides a gentle wave stimulus, similar to that provided by an amusement park Ferris Wheel Two cats may be tested at the same time This device is useful for studies of putative antimotion sickness drugs or the biochemical basis of the emetic response to motion Author

A85-42078
PERFORMANCE FOLLOWING A 500-675 RAD NEUTRON PULSE
M G YOCHMOWITZ, G C BROWN, and K A HARDY (USAF, School of Aerospace Medicine, Brooks AFB, TX) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, June 1985, p 525-533 refs

A three-light, three-lever discrete avoidance behavioral task was initiated to study the effects of a 500-675 rad neutron pulse upon performance Eight primates performed the task for 4 h (3.5 h postexposure) on exposure day and for 4 h on each of 3 d postexposure For the exposure day, five subjects had a decrease in correct responses, seven had increased reaction times, and six experienced productive emesis within 3 5 hours postexposure Although the performance degradations were not severe, these data suggest that the performance of time critical tasks could be significantly impaired Author

A85-42099* Louisville Univ , Ky
ROLE OF INTERFERON IN RESISTANCE AND IMMUNITY TO PROTOZOA
G SONNENFELD, A L. W DEGEE, J M MANSFIELD, A L NEWSOME, R R ARNOLD (Louisville, University, KY, Emory University, Atlanta, GA, Michigan State University, East Lansing) et al IN The biology of the interferon system 1984 Amsterdam, Elsevier Science Publishers, 1985, p 299-305 refs
(Contract NCC2-213, NIH-AI-15467)

Production of interferon (I) in response to protozoan infection, and the interferon-mediated inhibition of parasite replication were studied in order to determine if these effects may be related to immunologic-mediated resistance of the hosts Two extracellular parasites-Trypanosoma brucei rhodesiense and Naegleria fowlei were used Upon infection with the trypanosome, only resistant strains of mice produced I An early peak of alpha/beta I is followed by appearance of gamma I, which coincided with antibody production and a drop in parasitemia In case of the amoeba, pretreatment of its suspension with alpha/beta I inhibits its replication in vitro, and appears to protect mice from the infection and the disease It is proposed that production of interferon, with its regulatory effect on the immune responses, may play a major role in regulating the processes of protozoan-caused diseases I S

A85-42274
PATHOGENESIS AND PREVENTION OF STRESS-RELATED AND ISCHEMIC HEART DISORDERS [PATOGENEZ I PREDUPREZHDENIE STRESSORNYKH I ISHEMICHESKIKH POVREZHDENII SERDTSA]
F Z MEERSON Moscow, Izdatel'stvo Meditsina, 1984, 272 p In Russian refs

Consideration is given to the pathogenic mechanisms leading to disorders of the metabolism, structure and function of the heart muscle The physiological characteristics of both stress-related and ischemic heart disease are described, and the basic organic processes of prevention and repair of the myocardium following injury are listed A number of chemical compounds found to be effective in preventing and repairing myocardial damage are discussed, including endogenic metabolites, antoxidant compounds, and calcium transport inhibitors A program of adaptation to high altitude hypoxia, which has been effective in treating and preventing myocardial disease is also described I H

A85-42633
A MECHANISM FOR THE DEVELOPMENT OF DIFFERENCES IN THE NATURAL RESISTANCE OF RATS TO SEVERE HYPOXIA [K VOPROSU O MEKHAIANIZME FORMIROVANIIA RAZLICHII V ESTESTVENNOI REZISTENTNOSTI KRYS K OSTROI GIPOKSICHESKOI GIPOKSII]
V A BEREZOVSKII, O A BOIKO, L A KURBAKOV, and T N GRIDINA (AN USSR, Institut Fiziologii, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev) (ISSN 0201-8489), vol 31, May-June 1985, p 257-262 In Russian refs

A85-42635
CHANGE IN GLUTATHIONE REDUCTASE ACTIVITY IN THE BLOOD AND TISSUES OF THYROIDECTOMERIZED ANIMALS ACCOMPANIED BY TEMPERATURE DROPS [IZMENEIE AKTIVNOSTI GLUTATIONREDUKTAZY V KROVI I TKANIAKH TIREOIDEKTOMIROVANNYKH ZHIVOTNYKH PRI DEISTVII PERTEPADOV TEMPERATURY]
R B BEKBOSYNOVA and Z IA DOLGOVA (Semipalatinskii Meditsinskii Institut, Semipalatinsk, Kazakh SSR) Fiziologicheskii Zhurnal (Kiev) (ISSN 0201-8489), vol 31, May-June 1985, p 312-315 In Russian refs

A85-42636
THE EFFECT OF HYPEROXIC HELIUM-OXYGEN GAS MIXTURES ON OXYGEN CONSUMPTION OF WHITE RAT TISSUES [K VOPROSU O VLIIANII GIPEROKSICHESKIKH GELIEVO-KISLORODNYKH GAZOVYKH SMESEI NA POTREBLENIE KISLORODA TKANIAMI BELYKH KRYS]
A I NAZARENKO and T N GOVORUKHA (AN USSR, Institut Fiziologii, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev) (ISSN 0201-8489), vol 31, May-June 1985, p 346-349 In Russian refs

A85-42640
THE PALLIDUM (MORPHOLOGY AND PHYSIOLOGY) [PALLIDUM /MORFOLOGIIA I FIZIOLOGIIA/]
ZH S SARKISIAN and L. S GAMBARIAN Yerevan, Izdatel'stvo AN Armianskoi SSR, 1984, 140 p In Russian refs

Detailed information on the morphology and afferent and efferent connections of the pallidum is presented together with physiological data on the role of the pallidum in mechanisms of

motor reactions and behavior The pallidum is considered as a 'target' of stereotaxic operations during the surgical treatment of Parkinson's disease It is shown that, as well as having a formative and modulating effect on conditioned reflexes, the pallidum also participates in memory mechanisms, along with the cerebral cortex, the pallidum participates in the higher activity of the nervous system B J

A85-43059
A POSSIBLE DRIVING MECHANISM FOR REGIONAL REDISTRIBUTION OF CARDIAC OUTPUT DUE TO HYPOVOLEMIA [OB ODNOM IZ VOZMOZHNYKH PUSKOVYKH MEKHANIZMOV REGIONARNYKH PERERASPREDELENII SERDECHNOGO VYBROSA PRI GIPEVOLEMII]
G S MAZURKEVICH and A I TIUKAVIN (Nauchno-Issledovatel'skii Institut Skoroi Pomoshchi, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 71, May 1985, p 575-580 In Russian refs

The role of the sinocarotidal reflexogenic zone, a neurohormonal *mechanism in the brain in the redistribution of cardiac output due* to hypovolemia has been investigated experimentally in 40 narcotized cats It is shown that cardiac output in the abdominal aorta was reduced in cats with intact sinocarotidal reflexogenic zones in the presence of hypovolemia (20 percent of blood volume) A relative increase in blood flow was found in the tissues and organs in front of the diaphragm Following excision of the sinocarotidal zones, no increase in blood flow to the abdominal tissues was observed It is concluded based on the experimental results that sinocarotidal reflexogenic zones have an important role in the regulation of basic circulation parameters and regional blood volume I H

A85-43060
CHANGES IN CARDIOVASCULAR FUNCTION AND HEART ADRENERGIC INNERVATION IN THE PRESENCE OF IMMOBILIZATION STRESS [IZMENENIIA SERDECHNO-SOSUDISTYKH FUNKTSII I ADRENERGICHESKOI INNERVATSII SERDTSA PRI IMMOBILIZATSIONNOM STRESSE U KRYS]
A M BUNIATIAN, K M MARIAN, and P A KARGINA-TERENTEVA (Nauchno-Issledovatel'skii Institut Normal'noi Fiziologii, Moscow, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 71, May 1985, p 581-586 In Russian refs

It is found that the density of the distribution of adrenergic neural terminals in rat myocardial tissues was reduced following thirty hours of immobilization stress Immediately before death, the density of neural terminals was at its lowest point Because the main cause of death among the rats was a progressive loss of arterial blood pressure, it is suggested that the reduced distribution of adrenergic terminals was related to a progressive decrease in cardiovascular function Changes in the distribution of adrenergic terminals in the myocardial tissue are shown in a series of photographs I H

A85-43061
THE NATURE OF BARORECEPTOR REFLEXES IN THE PRESENCE OF NEGATIVE AND POSITIVE EMOTIONAL STIMULI [KHARAKTER BARORETSEPTORNYKH REFLEKSOV PRI NEGATIVNYKH I POSITIVNYKH EMOTSIOGENNYKH VOZDEISTVIIAKH]
M G PLISS, N A PATKINA, and V A TSYRLIN (I Leningradskii Meditsinskii Institut, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 71, May 1985, p 587-592 In Russian refs

Variations in blood pressure (BP), intersystolic interval (II), and baroreflex sensitivity (BS) were studied experimentally in rats in both negative and positive emotional states The negative emotional state was induced by ringing a bell and by involuntary electrical stimulation of the brain stem The positive emotion state was induced by cerebral self-stimulation It is shown that BP increased during the negative emotional state while II and BS both decreased The positive emotional state was associated with an increase in BP, and a decrease in II Baroreflex sensitivity remained unchanged in the positive emotional state Some implications of the experimental results are discussed I H

A85-43062
THE INTERRELATION OF THE MORPHO-FUNCTIONAL CHARACTERISTICS OF THE ERYTHRON SYSTEM AND HEMOSYNTHESIZING ENZYME ACTIVITY IN THE PRESENCE OF HEAT [O VZAIMOSVIAZI MORFO-FUNKTSIONAL'NYKH KHARAKTERISTIK ERITRONA I AKTIVNOSTI GEMSINTEZIRUIUSHCHIKH FERMENTOV PRI TEPLOVOM VOZDEISTVII]
L P VARYPAEVA and IU M ZAKHAROV (Cheliabinskii Gosudarstvennyi Meditsinskii Institut, Chelyabinsk, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 71, May 1985, p 625-630 In Russian refs

A85-43063
THE EFFECT OF HYPOXIA AND HYPOXIC HYPERCAPNIA ON HEMODYNAMIC INDICES AND ACID-BASE BALANCE IN DOGS [VLIIANIE GIPOKSICHESKOGO I GIPOKSICHESKI-GIPERKAPNICHESKOGO VOZDEISTVII NA POKAZATELI GEMODINAMIKI I KISLOTNO-OSNOVNOGO SOSTOIANIIA KROVI U SOBAK]
G D PAK and I S KULBAEV (AN KSSR, Institut Fiziologii, Alma-Ata, Kazakh SSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 71, May 1985, p 666-668 In Russian refs

A85-43099
KU AND K-BAND IRRADIATION OF GIANT ALGAL CELLS - THE ABSENCE OF DETECTED BIOEFFECTS AT 100 W/SQ M
K M BRUNKARD (East Stroudsburg, University, PA) and W F PICKARD (Washington University, St Louis, MO) IEEE Transactions on Biomedical Engineering (ISSN 0018-9294), vol BME-32, Aug 1985, p 617-620 refs
(Contract NSF ECS-81-05485)

A85-43102
STUDY OF MINIMAL INHIBITORY CONCENTRATION OF ANTIBIOTICS ON BACTERIA CULTIVATED IN VITRO IN SPACE (CYTOS 2 EXPERIMENT)
R TIXADOR, G RICHOILLEY, G GASSET, J TEMPLIER, J C BES (Centre National d'Etudes Spatiales, Centre Hospitaliere Universitaire de Ranqueil, Toulouse, France) et al Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, Aug 1985, p 748-751 refs

The aim of the Cytos 2 experiment, carrier out during the French-Soviet manned flight in July 1982, was to study the bacteria's sensitivity to antibiotics cultivated in vitro during the orbital flight, using the bacterial method of minimal inhibitory concentration (MIC) Two species of bacteria were tested with various antibiotics Staphylococcus aureus with Oxacillin, Chloramphenicol and Erythromycin, Escherichia coli with Colistin and Kanamycin The results show an increse in resistance to antibiotics particularly strong an increase in resistance to antibiotics particularly strong in E coli and weaker in Staphylococcus aureus Considering these results, it is believed that there might be a relationship between the increase in resistance to antibiotics and a stimulating effect on growth rate by the factors of environmental space Author

A85-43106
FOOD DEPRIVATION AND EXERCISE IN THE HEAT - THERMOREGULATORY AND METABOLIC EFFECTS
R P FRANCESCONI and R W HUBBARD (U S Army, Research Institute of Environmental Medicine, Natick, MA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, Aug 1985, p 771-776 refs

The effects of food deprivation (FD), for the intervals of 24, 48, and 72 h, on thermoregulatory, physiological and metabolic responses were determined in rats exercised in the heat (35 C) to hyperthermic exhaustion FD did not alter short-term endurance capacity After prolonged treadmill exercise, the values of core

temperature (after 27 min treadmill time) and of tail-skin temperataure (after 20 min) for the control group were singificantly higher than for all three FD groups, and the differences persisted through 30 min Heat exercise after FD intervals of 48 and 72 resulted in hypoglycemia, which was accompanied by marked reduction of the already low blood insulin, as well as in significant hypertriglyceridemia and hyperlactacidemia Levels of Na, K, urea nitrogen, and creatine phosphokinase were unaffected I S

A85-43109
LOWER BODY NEGATIVE PRESSURE IN THE TRANQUILIZED RAT
T G BEDFORD and C M TIPTON (Iowa, University, Iowa City) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, Aug 1985, p 786-790 refs
(Contract NIH-HL-21245-05, NIH-HL-29099-01, NIH-GM-07045-04)

The application of lower body negative pressure (LBNP) to tranquilized rats was assessed as an experimental technique to evaluate the response of the cardiovascular system to hypotension After pilot studies had demonstrated that diazepam (600 micrograms/kg, i v) had no significant influence on the pressor response to unilateral carotid occlusion in unanesthetized and unrestrained rats, subsequent rats were tranquilized When LBNP was applied, the decline in central venous pressure was linearly related to the level of negative pressure as was the initial fall in mean arterial pressure (MAP) Pulse-interval was highly correlated with the initial fall of MAP The results indicate that the application of LBNP in the tranquilized rat can effectively produce systemic hypotension and elicit cardiovascular reflexes similar to those reported for other animals in response to LBNP, including humans Author

A85-43110
EARLY CENTRAL VENOUS PRESSURE CHANGES IN THE RAT DURING TWO DIFFERENT LEVELS OF HEAD-DOWN SUSPENSION
F G SHELLOCK, H J C SWAN, and S A RUBIN (Cedars-Sinai Medical Center, Los Angeles, CA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, Aug 1985, p 791-795 Research supported by the Cedars-Sinai Medical Center refs
(Contract PHS-2271, NIH-HL-0738-05)

The effects of weightlessness, simulated by head-down suspension, and of varying degrees of the suspension head-down tilt angle on cardiovascular adaptive response were studied Central venous pressure (CVP) was measured by means of chronically implanted CVP catheters in rats subjected to either 45 degrees (Group A) or 20 deg (Group B) head-down tilt angle for 24 h Throughout the study, CVP was higher in group A than in Group B In both groups CVP increased significantly during the first 15 min, reaching a peak at 60 min. At 24 h the CVP in rats of Group B returned to the base level, but remained elevated in Group A It is concluded that the angle of the head-down tilt affects both the early CVP response and the subsequent cardiovascular adaptation to simulated weightlessness I S

A85-43274*
EFFECTS OF INTERFERON ON ANTIBODY FORMATION
G SONNENFELD IN Interferon Volume 2 - Interferons and the immune system Amsterdam, Elsevier Science Publishers, 1984, p 85-99 refs
(Contract NCA2-OR-400-901, NCA2-OR-400-101, NCC2-2)

Studies of the effects of interferon on primary and secondary antibody responses and of the relationship of interferon to other cytokines, or cell products, are presented Dosage- and timing-dependent immunoenhancing and immunosuppressive activities of interferon are documented for mouse spleen cell cultures and for mice infected with murine hepatitis virus (MHV-3) A possibility that altered interferon production might lead to immunopathological disorders, such as lupus erythematosus, AIDS, arthritis, etc , is discussed Latest technological developments are presented that indicate that interferon does apparently play a major role in the regulation of antibody responses I.S

N85-30583# Joint Publications Research Service, Arlington, Va
USSR REPORT: SPACE BIOLOGY AND AEROSPACE MEDICINE, VOLUME 18, NO. 5, SEPTEMBER - OCTOBER 1984
O G GAZENKO, ed 20 Nov 1984 151 p refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep - Oct. 1984
(JPRS-USB-84-007) Avail NTIS HC A08

Space biology and aerospace medicine research in the U S S R are discussed The phychophysiological nature of Aircraft Feel, standards for noise levels, radiation effects, and the physiological effects of long duration space flight are among the topics discussed

N85-30591# Joint Publications Research Service, Arlington, Va
PRIMATE ADRENAL REACTIONS TO ANTIORTHOSTATIC HYPOKINESIA
Y A SAVINA, A S PANKOVA, O Y KABITSKAYA, G S BELKANIYA, and D S TAVADYAN *In its* USSR Rept Space Biol and Aerospace Med , Vol 18, No 5, Sep -Oct 1984 p 45-50 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep -Oct 1984 p 30-34
Avail NTIS HC A08

The following experiments were performed to study the morphology of the adrenals of male rhesus monkeys six monkeys were exposed to clinostatic hypokinesia for 7 days and then to head-down tilt at -6 deg for 12 days, two monkeys were exposed only to head-down tilt for 7 days, and 5 monkeys were used as controls The adrenals exhibited changes of three types stress reaction manifestations, activation of the glomerular area of the cortex, and synchronization of the medullary matter to noradrenaline production All these changes reflect adaptive reactions of the animal body to head down tilt Author

N85-30592# Joint Publications Research Service, Arlington, Va
LONG TERM EXPOSURE OF ANIMALS TO ANTIORTHOSTATIS (-90 DEG) AS A MODEL OF CRITICAL HOMEOSTATIC DISTURBANCES
V V BOGOMOLOV, V Y TABAK, V V LENSKIY, M S BOGUSHEVICH, L L STAZHADZE, G G IVANOV, V V GALCHIN, Z M KUDRYASHOVA, and V A VOSTRIKOV *In its* USSR Rept Space Biol and Aerospace Med , Vol 18, No 5, Sep -Oct 1984 p 51-57 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep -Oct 1984 p 34-38
Avail NTIS HC A08

The cardiovascular effect of head down tilt (at an angle of -90 deg) was investigated in 25 mongrel dogs exposed to general anesthesis, myorelaxation or pulmonary ventilation Changes in the circulation and contractility parameters can be subdivided into three periods At the early stages of the exposure an increase in contractile function and hemodynamic changes typical of preload were seen At later stages progressive disorders of systemic and regional hemodynamics, inhibition of contractile function, and increasing metabolic changes were observed All this resulted in the death of the animals after 12 to 20 hours of head down tilt. Gross structural changes that occassionally were irreversible were detected in organs of the dead animals Author

N85-30593# Joint Publications Research Service, Arlington, Va
RAT BONE TISSUE AFTER FLIGHT ABOARD COSMOS-1129 BIOSATELLITE
I V ROGACHEVA, G P STUPAKOV, A I VOLOZHIN, M N PAVLOVA, and A N POLYAKOV *In its* USSR Rept Space Biol and Aerospace Med , Vol 18, No 5, Sep -Oct 1984 p 58-64 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep -Oct 1984 p 39-44
Avail NTIS HC A08

Bones of rats flown for 19 days onboard Cosmos-1129 were examined The examination included bone mass, density, mineral composition, reconstruction parameters and elemental composition at R+1, R+6, and R+29 After flight the rats developed

osteoporosis in the spongy structures of tubular bones and a smaller thickness of the cortical layer of the diaphysis, they showed no mineralization of the microstructure, a slight decrease of the Ca concentration, and a normal content of P At R+6 these changes progressively developed and at R+29 they returned to normal Author

N85-30594# Joint Publications Research Service, Arlington, Va
EFFECT OF PERIODIC ACCELERATIONS ON PHYSIOCHEMICAL PROPERTIES AND CA2+ REACTIVITY OF ACTOMYOSIN IN WHITE RAT MYOCARDIUM AND SKELETAL MUSCLES
B A TIKUNOV, M A KAYFADZHYAN, and S S OGANESYAN *In its* USSR Rept Space Biol and Aerospace Med, Vol 18, No 5, Sep-Oct 1984 p 65-70 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep-Oct 1984 p 44-47
Avail NTIS HC A08

Under the influence of regular acceleration (5 g for 25 min during 15 days) Mg sup 2+-ATPase activity of native and desensitized actomyosin of the myocardium and femurs of white rats increased This was in correlation with increases in the rate of actomyosin superprecipitation (Vspp) and in the surface charge of macromolecules The control animals showed a decrease in the inhibition of Mg sup 2+-ATPase and Vspp of native actomyosin by tropomyosin-troponin Ca sup 2+ in a concentration of 10 to the -7 to 10 to the -4 M stimulated Mg sup 2+-ATPase of native actomyosin of experimental animals by 50% only, but the maximum activation of Vspp was significantly higher than in the controls It is assumed that these changes tend to increase the efficiency of the actomyosin system Author

N85-30595# Joint Publications Research Service, Arlington, Va
OXYGEN UPTAKE AS AN INDICATOR OF ANIMAL ADAPTATION TO ALTITUDE HYPOXIA
V B MALKIN and Y V LOGINOVA *In its* USSR Rept Space Biol and Aerospace Med, Vol 18, No 5, Sep-Oct 1984 p 71-74 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep-Oct 1984 p 47-50
Avail NTIS HC A08

Altitude chamber experiments have shown that the quantity of oxygen consumption in the posthypoxic period as an index of adaptation to hypoxia is of low informative value during the normal course of adaptation, oxygen consumption changes insignificantly or decreases slightly, it increases somewhat if the hypoxic atmosphere contains CO2 (pCO2 = 19-27 mm Hg) and declines significantly (by 22 6%) only if adaptation is disordered At the same time, oxygen consumption can be a highly informative index, characterizing the efficiency of adaptation to hypoxia only if it is measured immediately after exposure to acute hypoxia In this experimental design the magnitude of oxygen consumption increases with increasing oxygen debt which, as follows from our experiments, shows the degree of conditioning to altitude hypoxia Author

N85-30596# Joint Publications Research Service, Arlington, Va
DISTINCTIONS OF RAT LYMPHATIC ORGAN REACTIONS TO ACUTE STRESS FACTOR DURING HYPOKINESIA
Y V VOROTNIKOVA *In its* USSR Rept Space Biol and Aerospace Med, Vol 18, No 5, Sep-Oct 1984 p 75-81 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep-Oct 1984 p 50-54
Avail NTIS HC A08

Female rats long exposed to hypokinesia were then subjected to an acute stress In this situation the thymus and spleen were examined The destructive process in the thymus increased in spite of its hypoplasia This can be attributed to a greater production of corticosteroids by the adrenals caused by the chronic stress At the same time the white pulp of the spleen decreased insignificantly because it contained no lymphocytes capable to migrate by the time of the acute stress effect It is concluded that enhanced destruction of lymphocytes in the thymus in response to an acute stress can be regarded as a diagnostic test of the adrenal state during a chronic stress effect, including hypokinesia Author

N85-30600# Joint Publications Research Service, Arlington, Va
CHROMOSOME ABERRATIONS IN CREPIS CAPILLARIS EXPOSED TO GAMMA RADIATION AND CLINOSTAT
G P PARFENOV and V P ZHVALIKOVSKAYA *In its* USSR Rept Space Biol and Aerospace Med, Vol 18, No 5, Sep-Oct 1984 p 101-105 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep-Oct 1984 p 68-71
Avail NTIS HC A08

The rate of cell division and emergence of spontaneous and radiation chromosomal aberrations in Crepis capillaris exposed to clinostating were determined The plants were gamma-irradiated with 300 R during clinostating when the primary roots were 1 to 2 mm long The velocity of clinostat rotation was 2 rpm The mitotic index was not affected by clinostating alone or combined with irradiation The exposure to clinostating did not change significantly the total frequency of nuclear aberrations or the distribution of the aberrations of the chromosomal and chromatin type and aberrations resulting from one or two radiation events It is concluded that the effect of clinostating combined with gamma-irradiation is zero E A K

N85-30601# Joint Publications Research Service, Arlington, Va
EFFECT OF TRIPHTHASINE AND ELENIUM ON CHANGES IN EVOKED BIOELECTRICAL ACTIVITY OF THE BRAIN EXPOSED TO STATIONARY MAGNETIC FIELD
L D KLIMOVSKAYA and A S DYAKONOV *In its* USSR Rept Space Biol and Aerospace Med, Vol 18, No 5, Sep-Oct 1984 p 106-110 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep-Oct 1984 p 71-74
Avail NTIS HC A08

Evoked potentials (EP) of the sensorimotor cortex of the large hemispheres, reticular formation of the midbrain and cerebellum resulting from the stimulation of the sciatic nerve were recorded on ratio The exposure to a onstant magnetic field of 0 4 T led to an increase of the amplitude and a complication of the shape of EP's due to the appearance of new components It is found that pretreatment with triphthasine and elenium suppresses the magnetic field effect E A K

N85-30602# Joint Publications Research Service, Arlington, Va
RADIOPROTECTIVE EFFICACY OF ATP AND ADENOSINE WITH EXPOSURE TO HIGH ENERGY PROTONS
M V TIKHOMIROVA, P N YASHKIN, B S FEDORENKO, and K S CHERTKOV *In its* USSR Rept Space Biol and Aerospace Med, Vol 18, No 5, Sep-Oct 1984 p 111-115 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep-Oct 1984 p 75-77
Avail NTIS HC A08

The radioprotective effect of ATP and adenosine was investigated on CBA and C sub 57 B1 mice hybrids F sub 1 irradiated with 9 GeV protons The prophylactic treatment of the animals with ATP at a dose of 350 to 700 mg/kg increased their survival to 63 to 80% for LD sub 78 to 83/30 and to 40% for LD sub 96/30 The administration of adenosine at a dose of 340 mg/kg, equimolar to 700 mg/kg ATP, increased their survival to 9 to 100% and 73%, respectively It was found that ATP produced a favorable effect on the hemopoiesis of irradiated mice E A K

N85-30603# Joint Publications Research Service, Arlington, Va
MORPHOLOGICAL STUDY OF PRIMATE HYPOTHALAMUS AND HYPOPHYSIS AFTER EXPERIMENT WITH ANTIORTHOSTATIC HYPOKINESIA
Y I ALEKSEYEV, Y A SAVINA, and G. S BELKANIYA *In its* USSR Rept Space Biol and Aerospace Med, Vol 18, No 5, Sep-Oct 1984 p 116-121 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep-Oct 1984 p 78-81
Avail NTIS HC A08

Investigation of large-cell neurosecretory nuclei of the hypothalamus and adenoneurohypophysis of primates is rather important to comprehension of the mechanisms responsible for impairment of fluid metabolism and tissue growth in animals and man exposed both to weightlessness and model experiments using long-term hypodynamia The data obtained to date warrant the assumption that the partial discharge of fluid, as well as slowing of intracellular metabolic processes and growth of skeletomuscular system of tissues, are attributable, to some extent, to decline in level of secretion of antidiuretic hormone (ADH) vasopress and somatotropic hormone A morphological study of the hypothalamopituitary neurosecretory system (HPNS) and cell population of the primate adenohypophysis was conducted which produces somatotropin, after 7- and 19-day antiorthostatic (head-down tilt) hypokinesia (AOH) B W

N85-30605# Joint Publications Research Service, Arlington, Va
CHANGES IN NEPHRON AND JUXTAGLOMERULAR SYSTEM OF PRIMATE KIDNEYS UNDER THE EFFECT OF ANTIORTHOSTATIC HYPOKINESIA
A S PANKOVA and M A PALTSEV *In its* USSR Rept: Space Biol and Aerospace Med, Vol 18, No 5, Sep-Oct 1984 p 125-130 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep-Oct 1984 p 83-86
Avail NTIS HC A08

In recent years, many studies were pursued in order to demonstrate the mechanisms of action of clinostatic hypokinesia on the body, including the kidneys, however, no detailed morphological studies of primate kidneys had been made There are merely indications of accumulation of lipids in renal tubules during long-term hypokinesia Very few experimental studies of primates with antiorthostatic hypokinesia (AOH) have been conducted, and no morphological analysis of organic changes had been made Yet it is known that one observes redistribution of blood in the body, loss of fluid and some electrolytes, change in activity of the renin-angiotensin-aldosterone system in humans under AOH conditions A morphological study of primate kidneys under AOH conditions was conducted In particular the renal circulatory system and juxtaglomerular system (JGS), which secretes renin were studied The kidneys from 3 Macaca rhesus monkeys, which spent 7 days in clinostatic hypokinesia and 12 in AOH at an angle of -6 deg, in head-down position, and 2 monkeys submitted for 7 days only to AOH served as the material for this study B W

N85-30606# Joint Publications Research Service, Arlington, Va.
RAT BLOOD SERUM AND LIVER CARBOHYDRATES AND LIPIDS IN RECOVERY PERIOD AFTER 15-DAY HYPOKINESIA
P P POTAPOV and N A TIKHOMIROVA *In its* USSR Rept Space Biol and Aerospace Med, Vol 18, No 5, Sep-Oct. 1984 p 131-134 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep-Oct 1984 p 87-88
Avail NTIS HC A08

Restriction of motor activity leads to rather serious metabolic and functional disturbances. Systematic and comprehensive investigation of metabolic processes in the recovery period is necessary in order to work out some simple and effective rehabilitation measures There are relatively few works dealing with this matter Considerable fluctuations of blood lipid and sugar levels have been found in man and animals in the recovery period following long-term restriction of movement In some cases, the changes were even more significant than with immobilization These studies also revealed that even a prolonged recovery period is not sufficient for normalization of many metabolic parameters A study of lipid and carbohydrate content of the liver and blood serum at different stages of recovery following relatively brief (15 days) restriction of mobility is reported B W

N85-30607# Joint Publications Research Service, Arlington, Va
INFLUENCE OF LIMBORETICULAR COMPLEX ON SOME REACTIONS OF RABBITS
V Y KORYUKIN and V I USACHEV *In its* USSR Rept Space Biol and Aerospace Med, Vol 18, No 5, Sep-Oct 1984 p 135-137 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep-Oct 1984 p 88-90
Avail NTIS HC A08

Investigtions were carried out on the role of the amygdaloid complex of the temporal lobe of the brain, caudate nucleus and dorsomedial nucleus of the thalamus in formation of nystagmic and some autonomic vestibular reactions These structures are referable to the limboreticular complex of the brain, the connections of which, in particular with the vestibular system, have already been demonstrated by many authors The structures selected here have been virtually unstudied in this respect Experiments were performed on 89 chinchilla rabbits weighing 2 5-3 kg The dynamics of heart rate (HR) and respiration rate (RR) were studied while rotating the animals in an isolation chamber for 1 h on a special revolving device simulating angular sign-variable accelerations, by means of pendulumlike rotation of a horizontal platform with the animal to the left and right for 4 s, with maximum angular velocity of 180 deg s and 4-s interval between two rotations B W

N85-30608*# George Washington Univ, Washington, D C Science Communication Studies
PUBLICATIONS OF THE NASA CELSS (CONTROLLED ECOLOGICAL LIFE SUPPORT SYSTEMS) PROGRAM
P A DUFOUR, J L SOLBERG, and J S WALLACE Washington, D C NASA Jul 1985 37 p
(Contract NASW-3165)
(NASA-CR-3911, NAS 1 26 3911) Avail NTIS HC A03/MF A01 CSCL 06C

Publications on research sponsored by the NASA CELSS (controlled ecological life support systems) Program are listed The bibliography is divided into four areas (1) human requirements, (2) food production, (3) waste management, and (4) system management and control The 210 references cover the period from the inception of the CELSS Program (1979) to the present, as well as some earlier publications during the development of the CELSS Program Author

N85-30609*# Oklahoma State Univ, Stillwater Dept of Botany and Microbiology
MICROBIAL ECOLOGY OF EXTREME ENVIRONMENTS: ANTARCTIC YEASTS AND GROWTH IN SUBSTRATE-LIMITED HABITATS Final Report, 1 Dec. 1979 - 31 Aug. 1984
H S VISHNIAC 16 Jul 1985 11 p
(Contract NAGW-26)
(NASA-CR-176005, NAS 1 26 176005) Avail NTIS HC A02/MF A01 CSCL 06B

The high, dry valleys of the Ross Desert of Antarctic, characterized by extremely low temperatures, aridity and a depauperate biota, are used as an analog of the postulated extreme climates of other planetary bodies of the Solar System to test the hypothesis that if life could be supported by Ross, it might be possible where similar conditions prevail The previously considered sterility of the Ross Desert soil ecosystem has yielded up an indigenous yeast, Cryptoccus vishniacci, which is able to resist the extremes of cold, wet and dry freezing, and long arid periods, while making minimal nutritional demands on the soil F M R

N85-30610# Washington Univ, Seattle Bioelectromagnetics Research Lab
EFFECTS OF LONG-TERM LOW-LEVEL RADIOFREQUENCY RADIATION EXPOSURE ON RATS. VOLUME 8: EVALUATION OF LONGEVITY, CAUSE OF DEATH, AND HISTOPATHOLOGICAL FINDINGS Final Report, 1 Jun. 1980 - 31 Jul. 1984
L L KUNZ, R B JOHNSON, D THOMPSON, J CROWLEY, and C K CHOU Apr 1985 69 p
(Contract F33615-80-C-0612)
(AD-A154283, SR-28, USAFSAM-TR-85-11) Avail NTIS HC A04/MF A01 CSCL 06R

For 25 months 100 male SPF (Specific-Pathogen-Free) rats were exposed to pulsed 2450-MHz circularly polarized microwaves, at an average power density of 0 48 mW/sq cm, another 100 rats served as sham-exposed controls Evaluation of survival time showed no statistically significant difference during any phase of the life span There was no association between a specific cause of death and the treatment condition Except for rats that died of urinary tract blockage, there is some indication that the survival times were longer in the exposed animals Of 1992 nonneoplastic lesions, only glomerulonephropathy was less frequently observed in the exposed animals, no other lesions differed statistically Of 192 neoplastic lesions observed, no specific increase was seen in any specific organ or tissue Collapsing of the data and an analysis with respect to the occurrence of all neoplasms showed no difference for benign lesions, but a statistically higher incidence of primary malignancies in the exposed animals than in the sham exposed The biological significance of this finding is questionable at this time GRA

N85-30611# California Univ, San Francisco
MOLECULAR TOXICOLOGY OF CHROMATIN: THE ROLE OF POLY(ADP-RIBOSE) IN GENE CONTROL Annual Progress Report, Oct. 1983 - 31 Dec. 1984
E KUN Feb 1985 137 p
(Contract F49620-81-C-0007)
(AD-A154415, AFOSR-85-0467TR) Avail NTIS HC A07/MF A01 CSCL 06T

This report pertains to the following research projects Chemical and macromolecular structure of poly(ADP-ribose)1 HPLC-isolation of poly(ADP-ribose) 2 Fractionation, size analysis branching of poly (ADP-ribose) by HPLC and chemical analysis of subunits 3 Mathematical model of polymerization of ADP-ribose II Biosystems III Molecular studies on purified poly(ADP-ribosylation in cellular and subcellular systems III Molecular studies on purified poly(ADP-ribose) polymerase system 1 DNA-association of benzamide 2 The role of lysine residues in the catalysis and DNA binding of poly(ADP-ribose)polymerase IV Cell transformation and poly ADP-ribosylation 1 Inhibition of carcinogen initiated transformation 2 Ultraviolet light induced transformation and its inhibition GRA

N85-30612# Texas A&M Univ, College Station Research Foundation
METABOLIC MECHANISMS OF PLANT GROWTH AT LOW WATER POTENTIALS Progress Report
J S BOYER Mar 1985 7 p
(Contract DE-FG05-84ER-13273)
Avail NTIS HC A02/MF A01

Research progress is reported for studies of the effects of low water potentials on cell enlargement and photosynthesis The investigations focussed on the localization of water potentials, differences in the response of shoots and roots to low water potential, early signals causing changes in growth rates, and the acclimation of photosynthesis to low water potentials DOE

N85-30613# California Univ, Berkeley Lawrence Berkeley Lab Biology and Medicine Div
BIOLOGY AND MEDICINE DIVISION Annual Report, 1983 - 1984
Apr 1985 263 p refs
(Contract DE-AC03-76SF-00098)
(DE85-010638, LBL-18393) Avail NTIS HC A12/MF A01

Significant developments in biology and medicine are highlighted Topics discussed include (1) research medicine, (2) radiosurgery, (3) environmental physiology, (4) radiobiophysics, (5) structural biophysics, and (6) cellular and molecular radio biology DOE

N85-30614# Harvard Medical School, Boston, Mass
THRESHOLD EFFECTS AND CELLULAR RECOGNITION Final Report, 1 Jul. 1979 - 31 Mar. 1984
R R RANDO Mar 1985 6 p
(Contract DE-AC02-79EV-10268)
(DE85-010816, DOE/EV-10268/T1) Avail NTIS HC A02/MF A01

The studies described here were focussed on the mechanism by which cell surface sugars might be involved in membrane-membrane recognition and adhesion Initially new methods were developed to incorporate sugars into membranes The first, by oxidative coupling technique and the second by incorporating synthetic cholesterol based glycolipids into membranes DOE

N85-30615# Washington Univ, Seattle Dept of Microbiology
GENETICS IN METHYLOTROPHIC BACTERIA Progress Report, 1 Feb. 1984 - 31 Jan. 1985
1985 4 p refs
(Contract DE-AT06-80ER-10680)
(DE85-011460, DOE/ER-10680/5) Avail NTIS HC A02/MF A01

New genetic techniques were developed The genetic regulation of C-1 specific functions was studied in methylotropic bacteria The genes were analyzed in facultative methanol-utilizers and the organisms used as hosts to study genes encoding similar functions from methane-oxidizers Several genes involved in growth on methanol were cloned and mapped from a facultative methylotroph DOE

N85-30616# Case Western Reserve Univ, Cleveland, Ohio Dept of Biochemistry
REPAIR OF DNA TREATED WITH LAMBDA-IRRADIATION AND CHEMICAL CARCINOGENS Progress Report, 1985-1985
D A GOLDTHWAIT 1 Mar 1985 8 p
(Contract DE-AC02-76EV-02725)
(DE85-010298, DOE/EV-02725/T4) Avail NTIS HC A02/MF A01

Research progress is reported in the following areas (1) DNA repair in HeLa cells, (2) a search for human transposable elements, (3) the effect of radiation and carcinogens on the activation of LTR sequences, and (4) studies on oncogenes of central nervous system tumors (ACR) DOE

N85-30617# Health and Safety Executive, Sheffield (England)
CHANGES IN THE IMPEDANCE AND BIOELECTRICAL ACTIVITY OF THE CEREBRAL CORTEX OF RATS UNDER THE ACTION OF ANAESTHETIC DRUGS
N V DMITRIYEVA, E V KULESHOV, and E K ORDZHONIKIDZE Apr 1985 11 p refs Transl into ENGLISH from Zhurnal Vysshej Nervnoj Deyatel'nosti (Moscow), v 18, no 3, 1968 p 463-468
(HSE-TRANS-10371) Avail NTIS HC A02/MF A01

The distribution and displacement of ions during stimulation of the cerebral cortex is studied and logical relations between ion shifts in the cortex and the functional state of the brain is established This progress has been particularly aided by the development of a method of measuring impedance which enables the observation of the dynamics of ion shifts in the extracellular medium and demonstrates the ability of the ions not only to displace

in the direction of an externally applied field, but also to diffuse into the cell and from the cell into the surrounding medium Certain changes in the physical and chemical condition of the cerebral cortex are demonstrated under the action of anaesthetic substances, and a method of recording the impedance and the electrical activity of the cerebral cortex of rats was used E R

N85-31744*# Jet Propulsion Lab , California Inst of Tech , Pasadena
BIOCATALYSIS PROJECT Annual Report, 1984
M DASTOOR 15 Apr 1985 37 p Sponsored in part by Battelle Pacific Northwest Labs.
(Contract NAS7-918)
(NASA-CR-176044, JPL-PUB-85-31, NAS 1 26 176044) Avail NTIS HC A03/MF A01 CSCL 06B

This report presents the fiscal year (FY) 1984 activities, accomplishments, and planned research efforts of the Biocatalysis Project In the Molecular Modeling and Applied Genetics work element, the following activities were carried out (1) physical and genetic evidence was provided for a method of inserting and amplifying genetically engineered traits in the chromosomes of microorganisms, (2) 16 strains of a mutant fungus with an above-average ability to synthesize the cellulose enzyme complex were identified and described genetically, and (3) a force-field model of enzyme behavior was refined and tested successfully for the enzyme thermolysin In the Bioprocess Engineering work element, advances were made in the mathematical modeling of cellular proesses at the molecular level such that the performance of different classes of bioprocess reactor vessels using various operating strategies can now be evaluated In the Process Design and Analysis work element, the impact of a combination of technical advances on the economics and energy efficiency of a biocatalyzed acetone/butanol/ethanol production process were analyzed, and development of a computer algorithm for defining and evaluating the energy consumption and facility/operating costs of a biocatalytic process was initiated B.W

N85-31745*# Pennsylvania State Univ , University Park Dept of Biophysics
KIDNEY CELL ELECTROPHORESIS Final Progress Report
P W TODD Jan 1985 464 p refs
(Contract NAS9-15584)
(NASA-CR-171889, NAS 1 26 171889) Avail. NTIS HC A20/MF A01 CSCL 06C

Tasks were undertaken in support of two objectives They are (1) to carry out electrophoresis experiments on cells in microgravity, and (2) assess the feasibility of using purified kidney cells from embryonic kidney cultures as a source of important cell products Investigations were carried out in the following areas (1) ground based electrophoresis technology, (2) cell culture technology, (3) electrophoresis of cells, (4) urokinase assay research, (5) zero-g electrophoresis, and (6) flow cytometry

N85-31780# Wisconsin Univ , Madison Genetics Lab
ORGANIZATION OF THE R REGION IN MAIZE Annual Progress Report
J KERMICLE Apr 1985 4 p
(Contract DE-AC02-76EV-01300)
(DE85-011273, DOE/EV-01300/49) Avail NTIS HC A02/MF A01

Allelic variation of R is manifest as tissue-specific expression of anthocyanin, conferred by independently acting units termed genic elements These elements often are organized as complexes of tandemly duplicated, homologous segments The structure of individual genic elements were illustrated which lead to a model of R structure whereby a genic element consists of a genetically short, tissue-specific component which is unique to given elements, and a longer tissue-nonspecific segment, common to other elements Various genetic phenomena exemplified by R are characterized including the behavior of transposable insertion sequences, unusual recombinational events, and alternative means of assessing genetic homology The behavior of transposable insertion sequences, unusual recombinational events, and alternative means of assessing genetic homology is reported DOE

N85-31781# Los Alamos National Lab , N Mex
DEVELOPMENT OF A RECOMBINANT DNA ASSAY SYSTEM FOR THE DETECTION OF GENETIC CHANGE IN ASTRONAUTS CELLS
S V ATCHLEY, D J C CHEN, G F STRNISTE, R A WALTERS, and R K MOYZIS 1984 18 p refs Presented at the Symp on Lunar Bases and Space Activities of the 21st Century, Washington, D C , 29 Oct 1984
(Contract W-7405-ENG-36)
(DE85-010103, LA-UR-85-823, CONF-8410230-12) Avail NTIS HC A02/MF A01

A new recombinant DNA system is being developed for the detection and measurement of genetic change in humans caused by exposure to low level ionizing radiation A unique feature of the method is the use of cloned repetitive DNA probes to assay human DNA for structural changes during or after irradiation Repetitive sequences exist in different families Collectively they constitute over 25% of the DNA in a human cell Repeat families have between 10 and 500,000 members Repetitive DNA sequence libraries using recombinant DNA techniques have been constructed Individual repeats comprising 75 to 90% of the mass of human repetitive DNA have been isolated and characterized Repeats used in our assay system exist in tandem arrays in the genome Perturbation of these sequences in a cell, followed by detection with a repeat probe, produces a new, multimeric ladder pattern on an autoradiogram The repeat probe used in the initial study is complementary to 1% of human DNA Therefore, the sensitivity of this method is several orders of magnitude better than existing assays Preliminary evidence from human skin cells exposed to acute, low-dose X-ray treatments indicates that DNA is affected at a dose as low as 5R Author

N85-31782# Research Inst of National Defence, Umea (Sweden)
FUNCTION OF A DEVICE FOR DETECTION OF BIOLOGICAL AEROSOLS IN FIELD TESTING
P HALLIN Nov 1984 26 p refs In SWEDISH, ENGLISH summary
(FOA-C-40194-B2, ISSN-0347-2124) Avail NTIS HC A03/MF A01, Research Institute of National Defence, Stockholm KR 50

A device for detection of biological aerosols based on alkaline luminoperborate reaction with ironporphyrins (e g , hematin) in microorganisms was developed Laboratory testing was done to optimize the system Results from field tests of two prototypes are presented The detection limit is 3 to 5 million bacteria/cum The time for collection, analysis, and detection is 5 min The two prototypes work well, even at high background levels which deteriorate the sensibility of the system Author (ESA)

N85-31783*# Research Inst of National Defence, Umea (Sweden)
EFFICIENCY TESTS OF SAMPLERS FOR MICROBIOLOGICAL AEROSOLS, A REVIEW
E HENNINGSON and I FAENGMARK Nov 1984 43 p refs In SWEDISH, ENGLISH summary
(FOA-C-40199-B1, ISSN-0347-2124) Avail NTIS HC A03/MF A01, Research Institute of National Defence, Stockholm KR 50

To obtain comparable results from studies using a variety of samplers of microbiological aerosols with different collection performances for various particle sizes, methods reported in the literature were surveyed, evaluated, and tabulated for testing the efficiency of the samplers It is concluded that these samplers were not thoroughly tested, using reliable methods Tests were conducted in static air chambers and in various outdoor and work environments. Results are not reliable as it is difficult to achieve stable and reproducible conditions in these test systems Testing in a wind tunnel is recommended Author (ESA)

N85-31784# Research Inst of National Defence, Umea (Sweden)
INVESTIGATION OF VARIATION IN THE CONCENTRATION OF BACTERIA IN OUTDOOR TESTING, WITH THE USE OF A DETECTOR FOR AEROSOLS OF BACTERIA
P HALLIN, G LINFORS, and G SANDSTROEM Sep 1984 20 p refs In SWEDISH, ENGLISH summary
(FOA-C-40201-B2, ISSN-0347-2124) Avail NTIS HC A02/MF A01, Research Institute of National Defence, Stockholm KR 50

The assay is based upon the alkaline luminoperborate reaction with ironporphyrins (e g , hematin) in microbes and especially bacteria By passing the liquid from the air sampler for 10 min through a 0 4 micron filter which eliminates bacteria, the chemiluminescence depending only on the reagents and the chemicals is determined The difference between the luminescence measured in the field test, and the previous figure, represents the background level in the air Results show a variation in concentration of bacteria at different times during the summer The amount of living bacteria = viable count (VC) was also determined The described detector counts living and dead bacteria Only 1 in 1000 bacteria are living when VC and chemiluminescence figures are compared Author (ESA)

N85-31785# Joint Publications Research Service, Arlington, Va
USSR REPORT: LIFE SCIENCES. BIOMEDICAL AND BEHAVIORAL SCIENCES
7 Jun 1985 133 p refs Transl into ENGLISH from various Russian articles
(JPRS-UBB-85-017) Avail NTIS HC A07/MF A01

Various life science, biomedical and behavioral science topics are discussed Agriculture, biochemistry, biotechnology, bionics epidemiology public health, and biophysics are a few of the areas covered

N85-31790# Joint Publications Research Service, Arlington, Va
CHANGES IN PENTOSE AND GLUCURONATE PATHWAY DEHYDROGENASES IN RAT BRAINS FOLLOWING SINGLE OR MULTIPLE HYPOTHERMIC EPISODES Abstract Only
N G VOLZHINA *In its* USSR Rept Life Sci Biomed and Behavioral Sci (JPRS-UBB-85-017) p 94-95 7 Jun 1985 Transl into ENGLISH from Ukr Biokhim Zh (Kiev), v 57, no 1, Jan - Feb 1985 p 67-70
Avail NTIS HC A07/MF A01

Studies were conducted on the changes in the dehydrogenase activities of the pentose and glucuronate pathways of the brain of rats subjected to hypothermic episodes lowering their rectal temperatures to 19 to 20 deg C A single reduction of body temperature to 20 deg C resulted in marked decrease in glucose-6-phosphate (1) and 6-phosphogluconate (2) dehydrogenases (pentose pathways), as well as in a increase in the activity of UDP-glucose dehydrogenase (3) glucuronate pathway After 5 to 7 hypothermic episodes, 1 and 2 showed a 15 to 25% decrease in activity, while 3 showed a 54% increase After 15 to 17 hypothermic episodes, 1 and 2 decreased 50 to 53% in activity, while the activity of 3 decreased 85% These cold-induced changes in the enzymes of the pentose and glucuronate pathways, which share the same basic substrate, places hem in competition with the Embden-Meyerhof pathyways for glucose-6-phosphate Author

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AEROSPACE MEDICINE

Includes physiological factors, biological effects of radiation, and weightlessness

A85-41325* National Aeronautics and Space Administration Ames Research Center, Moffett Field, Calif
EFFECTS OF SIMULATED WEIGHTLESSNESS ON BONE MINERAL METABOLISM
R K GLOBUS, D D BIKLE, and E MOREY-HOLTON (NASA, Ames Research Center, Moffett Field, CA, U S Veterans Administration, Medical Center, San Francisco, CA) Endocrinology (ISSN 0013-7227), vol 114, no 6, 1984, p 2264-2270 refs

It is pointed out that prolonged space flight, bedrest, and immobilization are three factors which can produce a negative calcium balance, osteopenia, and an inhibition of bone formation It is not known whether the effects of gravity on bone mineral metabolism are mediated by systemic endocrine factors which affect all bones simultaneously, or by local factors which affect each bone individually The present investigation has the objective to test the relative importance of local vs systemic factors in regulating the bone mineral response to conditions simulating weightlessness Experiments were conducted with male Sprague-Dawley rats The test conditions made it possible to compare the data from weighted and unweighted bones in the same animal The obtained findings indicate that a decrease in bone mass relative to control value occurs rapidly under conditions which simulate certain aspects of weightlessness However, this decrease reaches a plateau after 10 days G R

A85-41526
A RE-EVALUATION OF THE MINIMUM ALTITUDE AT WHICH HYPOXIC PERFORMANCE DECREMENTS CAN BE DETECTED
B FOWLER, M PAUL, M TAYLOR (York University, Ontario, Canada), G PORLIER (Defence and Civil Institute of Environmental Medicine, Ontario, Canada), and D D ELCOMBE (Civil Aviation Medical Unit, Ontario, Canada) Ergonomics (ISSN 0014-0139), vol 28, May 1985, p 781-791 Research supported by the Department of Health and Welfare refs

A series of experiments using various performance tests has failed to demonstrate an initial transient increase in reaction time on a spatial transformation task at an altitude of 8000 ft, as reported by Denison et al (1966) In experiments with a spatial transformation task performed at a workload of 27 W with the percentage of arterial oxyhemoglobin saturation (SaO2) held at the equivalent of 8000 feet in altitude, initial reaction time did not increase When SaO2 was stabilized at 8000 feet, and the workload was allowed to vary freely during the performance of the spatial transformation task, an increase in reaction time was observed which was associated to an accompanying decrease in SaO2 It is concluded that the minimum altitude at which hypoxic performance decrements can be detected is greater than 8000 feet The decreased arterial O2 saturation observed in the second experiment is explained by a combination of hypoxia, exercise, and hypoventilation due to breathing resistance It is argued that this combination may have been a factor in the increased reaction time found by Denision et al I H

A85-41642
INCREASED GRAVITATIONAL STRESS DOES NOT ALTER MAXIMUM EXPIRATORY FLOW
D PYSZCZYNSKI, S N MINK, and N R ANTHONISEN (Manitoba, University, Winnipeg, Canada, New York, State University, Buffalo) Journal of Applied Physiology (ISSN 0161-7567), vol 59, July 1985, p 28-33 Research supported by the Medical Research Council of Canada refs
(Contract NIH-HL-23190)

Six human subjects underwent centrifuge trials while being monitored for expiratory levels to determine if added gravitational

stress would affect regional lung emptying patterns and the maximum expiratory flow volume (MEFV) The subjects experienced 1, 2 and 3 g accelerations while full and 60 percent MEFV curves were generated from data obtained though a pneumotachograph An 80 percent He-20 percent O2 mixture was breathed No correlations were found between changes in gravitational stress and the MEFV curves It is postulated that the stresses may have affected the regional emptying sequences even though the total flows were steady M S K

A85-41644
EFFECT OF NORMOXEMIC AND HYPOXEMIC EXERCISE ON RENIN AND ALDOSTERONE
J W SHIGEOKA (Utah, University, Salt Lake City), G L COLICE (South Florida, University, Tampa), and G RAMIREZ (James Haley Veterans Hospital, Tampa, FL) Journal of Applied Physiology (ISSN 0161-7567), vol 59, July 1985, p 142-148 Research supported by the U S Veterans Administration and University of South Florida refs

Brief, rapid rises in plasma renin activity (PRA) are frequently observed during exercise at sea level, but not a high altitudes One group of five human subjects performed treadmill exercises in sea level atmosphere one day, then in simulated high altitude conditions the next A second group performed sequential sessions in each atmospheric condition on one day, then reversed the order on the second day Analyses of blood samples showed that PRA increased in both altitude conditions, while the plasma aldesterone levels (PLA) were significantly higher in normoxemic conditions than in hypoxemic conditions The PRA and PLA became disconnected in hypoxemic exercise, although the cause could not be identified M S K.

A85-41645
COMPARISON OF THERMAL RESPONSES BETWEEN REST AND LEG EXERCISE IN WATER
M M TONER, M N SAWKA, W L HOLDEN, and K B PANDOLF (U S Army, Research Institute of Environmental Medicine, Natick, MA) Journal of Applied Physiology (ISSN 0161-7567), vol 59, July 1985, p 248-253 refs

The thermal and metabolic responses of male human subjects were monitored during immersion in water at temperatures as low as 18 C in the presence and absence of leg exercise The respiratory volume, metabolic rate, and skin, rectal and esophageal heat flows were recorded, as was the body fat percent The data revealed that core temperature was more effectively maintained with leg exercise than with rest in cool and cold water M S K

A85-42051
CENTRAL EFFECTS OF H1 AND H2 ANTIHISTAMINES
A N NICHOLSON (RAF, Institute of Aviation Medicine, Farnborough, England) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, April 1985, p 293-298 refs

H1-antihistamines are usually associated with impairment of central nervous functions, but unacceptable decrements in performance may not be an inevitable sequel of their use Effects are dependent on the ability of a particular drug to cross the blood brain barrier, and so compounds which cross so slowly that tolerance of the central nervous system can develop gradually without any immediate changes in performance are of interest However, sustained release formulations and compounds which have a selective affinity for the peripheral receptor may also have their part to play in the management of allergic states in those involved in skilled activity As far as H2-antagonists are concerned, it is likely that as they are less liposoluble they would be free of central effects Studies on the central effects of H1 and H2 antagonists are reviewed, and tentative recommendations are made in respect of these findings concerning the possible use of these drugs in aircrew Author

A85-42052
HYPNOTICS AND AIRCREW
A N NICHOLSON, B M STONE (RAF, Institute of Aviation Medicine, Farnborough, England), and T ROTH (Henry Ford Hospital, Detroit, MI) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, April 1985, p. 299-303

The medical management of sleep disorders in aircrew members working irregular hours under demanding work conditions is discussed, with a focus on the use of hypnotic agents, reviewing the results of recent pharmacological experiments The persistence of effects and the possibility of residual sequelae are examined for relatively long-lasting hypnotics such as the diazepam family and for short-duration agents such as diazepines and cyclopyrolones, and a drug and dosage which can shorten sleep-onset latency, reduce awake activity and drowsy sleep, and leave sleep architecture unaffected are seen as the ideal The use of hypnotics for subjects of age 45 or older is considered, and some general recommendations based in part on recent Royal Air Force experience (Baird et al , 1983) are given T K

A85-42053
MILD HYPERTENSION
D H HULL (RAF, Central Medical Establishment, London, England) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, April 1985, p 304-309 refs

The history of antihypertensive drug treatment is reviewed and the results of therapeutic trials summarized Studies in aviation medicine and current aeromedical practice are described Despite the success of drug treatment, any effect on the occurrence of coronary events or of coronary deaths is slight Reasons for this disappointing outcome are suggested, and the implications for the treatment of hypertensive aviators are explored Author

A85-42054* Louisiana State Univ , Shreveport
EVALUATION OF ANTIMOTION SICKNESS DRUG SIDE EFFECTS ON PERFORMANCE
C D WOOD, J E MANNO, B R MANNO, H M REDETZKI, M J WOOD (Louisiana, State University, Shreveport) et al Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, April 1985, p 310-316 refs
(Contract NAS9-16801)

The effects of antimotion-sickness drugs on the performance in computerized-pursuit-meter tests of groups of ten 18-30-yr-old male and female subjects are investigated experimentally using double-blind placebo techniques The results are presented in tables and graphs and discussed in detail The proficiency scores are as good as or better than placebo values for subjects given d-amphetamine (DA) 5 or 10 mg, promethazine (P) 25 mg + scopolamine (S) 400 ng + DA 10 mg, S 1 mg + DA 10 mg, S 250-600 ng, marezine 50 mg, meclizine 50 mg, dimenhydrinate 50 mg, S 1 mg + DA 5 mg, or P 25 mg + DA 10 mg Significantly lower scores are seen in subjects given S 800 ng or 1 mg, P 25 mg (oral or IM), P 25 mg + S 400 ng, and P 25 mg oral + P 25 mg IM + DA 10 mg T K

A85-42055
THE ASSOCIATION OF AGE, FLYING TIME, AND AIRCRAFT TYPE WITH HEARING LOSS OF AIRCREW IN THE ISRAELI AIR FORCE
J RIBAK, S HORNUNG, P FROOM, A WOLFSTEIN, I E ASHKENAZI (Israel Air Force Aeromedical Centre, Tel Aviv) et al Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, April 1985, p 322-327 refs

A85-42060
PHYSIOLOGICAL CHARACTERISTICS OF ELITE SPORT PARACHUTISTS
R W DEITRICK (California, State University, Long Beach), D L HOLMES (Nevada, University, Las Vegas), and M MURPHY (Chapman College, Orange, CA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, April 1985, p 351-357 refs

The results of physiological fitness tests performed on a group of 10 male elite sport parachutists (skydivers) of ages 27-38 yrs and mean parachuting experience 10 8 yrs are reported and compared with those on a group of sedentary male subjects of the same ages and with published data on other elite athletes Significantly better aerobic power, vital capacity, maximum heart rate, back hyperextension flexibility, and body fat content are found relative to the controls, while differences in resting heart rate, absolute body weight, dominant-hand grip strength, and lower-back/hamstring flexibility are not significant The comparison with other elite athletes reveals generally similar values, but significantly lower aerobic power and higher relative body fat in the parachutists Regular aerobic exercise and stretching/flexibility programs are recommended for prospective sport parachutists
T K

A85-42063
HEALTH PRACTICES IN UNITED STATES AIR FORCE PERSONNEL COMPARED TO UNITED STATES ADULT CIVILIANS
H P WETZLER and D F CRUESS (Uniformed Services University of the Health Sciences, Bethesda, MD) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, April 1985, p 371-375 refs

A85-42064
CARDIOVASCULAR DISEASE AMONG U.S. NAVY PILOTS
A HOIBERG (U S Navy, Naval Health Research Center, San Diego, CA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, May 1985, p 397-402 Navy-supported research refs

This study's objectives were to determine the influence of age and occupational factors on cardiovascular disease (CVD) incidence among U S Navy pilots diagnosed with CVD during a 12 5-year time period (n = 150) and to identify precursory diseases associated with CVD Results showed a relationship between CVD and age, pilots, on the average, were more than 3 years younger at the time of CVD onset than other officers No occupational factor was associated with CVD, fighter pilots had the highest rates of acute myocardial infarction and chronic ischemic heart disease Angina pectoris was observed as a precursory disease of chronic ischemic heart disease, and several behaviorally related disorders (e g , alcoholism) occurred with hypertension Subsequent research should include all U S military pilots to examine, in a larger population, the influence on CVD of such occupational factors as flight in high-performance aircraft An intervention program should be implemented to modify the lifestyles of pilots who had been hospitalized for hypertension and/or such conditions as obesity and alcoholism
Author

A85-42066
EFFECTS OF A 7-DAY HEAD-DOWN TILT (-6 DEG) ON THE DYNAMICS OF OXYGEN UPTAKE AND HEART RATE ADJUSTMENT IN UPRIGHT EXERCISE
J STEGEMANN, D ESSFELD, and U HOFFMANN (Koeln, Deutsche Sporthochschule, Cologne, West Germany) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, May 1985, p 410-414 refs

Oxygen uptake (VO2) kinetics and heart rate (HR) kinetics were studied in six healthy male students before and on days 1, 3 and 5 after a continuous 7-d antiorthostatic bedrest (-6 deg) The exercise test protocol consisted of pseudorandom binary sequences (PRBS) of workload (W) performed on a bicycle ergometer in the upright position (20 W - 80 W, 15 bits, 30 s per bit, the sequence was repeated three times) Amplitude ratio and phase of the W-VO2 and W-HR relations were computed at six harmonic frequencies in the range 0 014 - 0 084 rad/s After bedrest the VO2 kinetics was found to be impaired at the harmonic frequencies greater than 0 056 rad/s Additionally, the mean heart rate during the PRBS cycles was increased (108 + or - 15 as compared to 92 + or - 10/min) There were no significant effects on HR kinetics and on the static W-VO2 relation During an endurance training program both VO2 and HR changes were restored to the prebedrest levels It is concluded that the impairment of VO2 kinetics can be attributed mainly to muscular factors
Author

A85-42071
PHYSIOLOGICAL ACCLIMATIZATION TO HEAT AFTER A SPELL OF COLD CONDITIONING IN TROPICAL SUBJECTS
G PICHAN, K SRIDHARAN, Y V SWAMY, S JOSEPH, and R K GAUTAM (Defence Institute of Physiology and Allied Sciences, Delhi, India) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, May 1985, p 436-440 refs

The effects of brief spells of cold conditioning on heat acclimatized tropical subjects on the decay and reacclimatization status to heat were evaluated on 12 Indian male infantry soldiers in the cooler months at Delhi After 8 d of heat acclimatization in a climatic chamber maintained at 45 C dry bulb and 30 percent relative humidity the subjects were conditioned to cold for 21 d by exposing them to a temperature of 10 C daily for 4 h During the cold-conditioning phase the subjects had no access to either heat exposure or strenuous work The cold conditioning was followed by reacclimatization to heat Significant loss in heat acclimatization status was observed, both in terms of exercise oral temperature and heart rate The loss in status after 1 d reinduction to heat acclimatization was in the range of 45-56 percent However, within 3 d all of the subjects once again regained the full acclimatization status The cold conditioning did not alter the sweat output during the reinduction to heat phase
Author

A85-42072
FATAL HEATSTROKE AFTER A SHORT MARCH AT NIGHT - A CASE REPORT
E ASSIA, Y EPSTEIN, and Y SHAPIRO (Chaim Sheba Medical Centre, Tel Aviv, Israel) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, May 1985, p 441, 442 refs

A85-42073
INTRACARDIAC ELECTROPHYSIOLOGIC STUDIES IN THE MEDICAL EVALUATION OF AVIATORS
W J OETGEN (U S Army, Walter Reed Army Medical Center, Washington, DC), S L JONES (Uniformed Services University of the Health Sciences, Bethesda, MD), and F S PETTYJOHN (Winn Army Community Hospital, Fort Stewart, GA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, May 1985, p 443-450 refs

Ten aviators with cardiac symptoms or electrocardiographic abnormalities underwent electrophysiologic testing Four patients were studied because of symptoms including palpitations, near-syncope, and sudden cardiac death Six patients were studied because of electrocardiographic abnormalities including AV block, right bundle branch block, sinus bradycardia, ventricular tachycardia, and questionable Wolff-Parkinson-White syndrome Three patients with bradycardia and/or AV block were found to have increased vagal tone A fourth patient had near-syncope and intra-Hisian block Of four patients evaluated for palpitations and/or tachycardias, one had nonsustained ventricular tachycardia, one had easily inducible ventricular tachycardia and fibrillation, one had a normal study, and one had coronary artery disease with an unanticipated prolonged HV interval The diagnosis of congenital right bundle branch block and Wolff-Parkinson-White syndrome were confirmed in the final two patients Performance of electrophysiologic testing provided objective data to allow appropriate therapeutic and administrative decisions in these aviators
Author

A85-42077
SPACE MOTION SICKNESS - ETIOLOGICAL HYPOTHESES AND A PROPOSAL FOR DIAGNOSTIC CLINICAL EXAMINATION
R J LEIGH (U S Veterans Administration, Medical Center, Cleveland, OH) and R B DAROFF (Cleveland, University Hospital, Case Western Reserve University, Hospital, Cleveland, OH) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, May 1985, p 469-473 Research supported by the U S Veterans Administration refs

The general notion that space motion sickness (SMS) is due to a conflict between vestibular, visual, and other sensory inputs has gained popular acceptance Three specific hypotheses for SMS are reviewed, and characteristic disorders of ocular motility that each hypothesis would predict are identified Accurate recording of horizontal and vertical eye movements during free head movements in spacecraft presents technical difficulties It is suggested that careful clinical examination may be useful, provided the examination is directed towards detecting those specific abnormalities predicted by each hypothesis Author

A85-42079
THE EFFECTIVENESS OF SPECIFIC WEIGHT TRAINING REGIMENS ON SIMULATED AERIAL COMBAT MANEUVERING G TOLERANCE
W L EPPERSON, R R BURTON, and E M BERNAUER (USAF, School of Aerospace Medicine, Brooks AFB, TX) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, June 1985, p 534-539 refs

The relationship between weight-training-induced muscle-group development and tolerance to 4 5 and 7 0 +Gz simulated aerial combat maneuvering (SACM) is investigated, evaluating statistically selected data from the experimental study of Epperson et al (1982) The results are presented in tables and graphs, and it is found that the 53-percent increase in SACM tolerance times observed in the weight-trained subjects is strongly correlated with a 99-percent increase in sit-up strength and a 26 2-percent increase in arm-curl strength Although the correlation with increases in leg-press and bench-press strength is less significant, multiple regression analysis for all four muscle groups yields a correlation of determination of 0 61 T K

A85-42080* National Aeronautics and Space Administration Ames Research Center, Moffett Field, Calif
RESPONSE TO MUSCULAR EXERCISE FOLLOWING REPEATED SIMULATED WEIGHTLESSNESS
V A CONVERTINO, C R KIRBY, G M KARST, and D J GOLDWATER (NASA, Ames Research Center, Moffett Field, CA, Arizona University, Tucson) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, June 1985, p 540-546 refs

The effects of 10-d 6-deg-head-down bed rest (BR1), 14 d of recovery, another 10 d bed rest (BR2), and another 14-d recovery on the cardiovascular response to a graded supine cycle ergometer test (4 min unloaded 60-rpm pedaling followed by 15-W/min increasing work load to volitional fatigue) are investigated experimentally in seven male nonsmokers of mean age 41 yrs, mean weight 80 2 kg, mean height 178 cm, and mean body fat content 22 3 percent Ergometer tests are performed before BR1, after BR1 and BR2, and 14 d after BR2 The results are presented in tables, and it is found that the significantly decreased maximum-O2-uptake, gas-exchange-aerobic-threshold, and plasma-volume responses and the increased submaximal and maximal heart rates observed (relative to pre-BR1 levels) after BR1 and BR2 return to pre-BR1 values 14 d after BR2 It is inferred that 14 d of mild exercise are adequate for recovery from even repeated exposure to this type of simulated weightlessness T K

A85-42081
AGE AND PILOT PERFORMANCE
M Y EYRAUD and M S BOROWSKY (U S Naval Safety Center, Norfolk, VA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, June 1985, p 553-558 refs

The relationship between pilot age and the likelihood of pilot-factor aviation mishaps is investigated statistically using data on naval pilots of fighter, attack, and helicopter aircraft for the period 1977-1982 The numbers of mishaps of various types are determined per 100,000 h flown by pilots of the age groups 26 and under, 27-29, 30-33, 34-37, and 38 and over, and the results are presented in tables and graphs Of the mishap types found to be strongly associated with age, several (including improper use of flight controls, overrun/undershoot at landing, improper landing response/technique, carrier landings, failure to maintain flying speed, and loss of control of attack and fighter aircraft) occur most frequently with pilots aged 26 or under, the highest rates for violation of regulations (helicopters) improper instrument procedures, and inadequate flight preparation are found in pilots aged 38 or more The implications of these findings for the certification and (re)training of older pilots are considered T K

A85-42083
A STUDY OF SOME FACTORS INFLUENCING MILITARY PARACHUTE LANDING INJURIES
J PIRSON and E VERBIEST (Training Centre for Parachutists, Schaffen, Belgium) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, June 1985, p 564-567 refs

In a retrospective study of 201,977 jumps carried out by male military parachutists over a 10-year period, landing injury rates were calculated according to the time of jump (day or night), the type of parachute, and meteorological data such as the wind speed, temperature, and the relative humidity at ground level The two types of parachutes used were both static-line-deployed nonsteerable canopies The landing injury rate was found to be influenced by darkness, the surface area of the parachute, wind speed, and possibly temperature when higher than 25 C The influence of surface wind was best described by two segments of line with a cutoff point The wind speed at the cutoff point is 6 56 m/s for day jumps and 3 47 m/s for night jumps Author

A85-42084
COMPARISON OF THE HUNTING REACTION IN NORMALS AND INDIVIDUALS WITH RAYNAUD'S DISEASE
J B JOBE, R F GOLDMAN, and W P BEETHAM, JR (U S Army, Army Research Institute of Environmental Medicine, Natick, Lahey Clinic Medical Center, Burlington, MA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, June 1985, p 568-571 refs

Cold-induced vasodilation (CIVD or hunting reaction) was studied in eight subjects with Raynaud's disease, an idiopathic vasospastic disorder of the peripheral vasculature, and in nine normal subjects using 5, 10, and 15-C water-bath immersions of the right middle finger Differences between Raynaud's and normal subjects were only marginal at 5 C, at 10 C, Raynaud's subjects showed a longer time to the first rise of skin temperature, had lower mean digital skin temperature, and a lower amplitude of their digital skin temperature during CIVD, at 15 C, Raynaud's subjects had a longer time to first rise, lower number of CIVD cycles, and a lower recovery temperature Author

A85-42085
THE ENVIRONMENTAL SYMPTOMS QUESTIONNAIRE IN ACUTE MOUNTAIN SICKNESS
A D WRIGHT, G T JONES, R F FLETCHER, J H MACKINTOSH, and A R BRADWELL (Birmingham, University, England) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, June 1985, p 572-575 Research supported by Lederle Laboratories, West Midlands Regional Health Authority, and Arthur Thompson Trust refs

The performance of the Environmental Symptoms Questionnaire (ESQ), a modified version of the questionnaire described by Sampson and Kobrick (1980), in evaluating the symptoms of acute

mountain sickness in one female and 19 male subjects aged 22-54 yrs during a 5-d ascent to 4980 m and a 4-d descent to 914 m is reported The structure of the ESQ and the data-reduction procedures are explained, and the responses (in twice-daily completions of the ESQ) are compared statistically with daily clinical AMS interviews in a table Highly significant correlations (p less than 0 001) with r values 0 70-0 77 are found for four groups of related symptoms T K

A85-42086
BIOGENIC AMINE/METABOLITE RESPONSE DURING IN-FLIGHT EMERGENCIES
G S KRAHENBUHL, J HARRIS, R D MALCHOW, and J R STERN (Arizona State University, Tempe) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, June 1985, p 576-580 Research supported by the Arizona State University refs
(Contract F33615-80-K-0022)

Urine excretion of epinephrine (E), norepinephrine (NE), dopamine (DA), serotonin (5HT) and the metabolites vanillylmandelic acid (VMA), 4-hydroxy-3 methoxyphenylglycol (MHPG), homovanillic acid (HVA), 3, 4-dihydroxyphenylacetic acid (DOPAC), and 5-hydroxyindoleacetic acid (5-HIAA) was determined for students (n = 19) and instructors (n = 21) involved in flying training in-flight emergencies Timed urine samples were analyzed using high-performance liquid chromatography with electrochemical detection Basal excretion rates were determined at a later date Four indices showed significant alteration during the emergencies Epinephrine and the sum of epinephrine plus norepinephrine increased, the ratio dopamine/norepinephrine decreased and the ratio norepinephrine/serotonin increased Instructors and students differed only in that VMA and the sum VMA and MHPG were higher in students Among the emergencies monitored, smoke and fumes in the cockpit and mechanical problems caused the greatest stress responses Author

A85-42087
DISCHARGE CHARACTERISTICS OF MOTOR UNITS AND THE SURFACE EMG DURING FATIGUING ISOMETRIC CONTRACTIONS AT SUBMAXIMAL TENSIONS
J S PETROFSKY and C A PHILLIPS (Wright State University, Dayton, OH) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, June 1985, p 581-586 USAF-supported research refs
(Contract DAMD17-80-C-0089)

Single-motor-unit discharge-frequency measurements and surface and electromyelograms (EMGs) obtained from eight male volunteers during voluntary and electrically stimulated maximal and submaximal fatiguing isometric contractions of the adductor pollicis muscles are reported The rms amplitude of the EMG during tension-to-fatigue trials at 25, 40, or 55 percent of maximum voluntary strength is shown to increase both over the course of the contraction and as a function of the tension applied, an effect attributed to the lower frequency of motor-neuron discharge at lower tensions T K

A85-42088
TRANSDERM SCOPOLAMINE EFFICACY RELATED TO TIME OF APPLICATION PRIOR TO THE ONSET OF MOTION
G D LEVY and M H RAPAPORT (California, University, Irvine) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, June 1985, p 591-593 refs

Transdermal scopolamine is evaluated, with a focus on the time of application prior to the onset of motion In this study 44 subjects participated The first group applied the transdermal disk within 4 h and the second group 8 h or more prior to the onset of motion A significant decrease in the incidence and the degree of motion sickness is observed in the group with at least 8 h of scopolamine application prior to sea travel Therefore, the transdermal scopolamine system should be applied at least 8 h before potentially disturbing motion to provide adequate prophylaxsis against motion sickness No significant difference in motion sickness susceptibility between men and women is found, in contrast to earlier reports Author

A85-42091* National Aeronautics and Space Administration Johnson (Lyndon B) Space Center,
OTOLITH TILT-TRANSLATION REINTERPRETATION FOLLOWING PROLONGED WEIGHTLESSNESS - IMPLICATIONS FOR PREFLIGHT TRAINING
D E PARKER, M F RESCHKE, A P ARROTT, J L HOMICK, and B K LICHTENBERG (NASA, Johnson Space Center, Houston, TX, Miami University, Oxford, OH) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, June 1985, p 601-606 Research supported by the Miami University refs
(Contract NAS9-14538)

Observations with three astronauts yielded two major findings First, perceived self-motion during sinusoidal roll differed immediately postflight from preflight Between 70 and 150 min after landing, roll was perceived primarily as linear translation Secondly, more horizontal eye movement was elicited by roll simulation immediately postflight relative to both preflight and later postflight observations These results support an 'otolith tilt-translation reinterpretation' hypothesis, which has clear implications for understanding astronaut reports of space motion sickness during the early period of orbital flight A proposal for 'prophylactic adaptation training' which may provide preflight adaptation to weightlessness, derives from this reearch Author

A85-42132
CERTAIN METHODS OF THE FUNCTIONAL EXAMINATION OF ATHLETES [NEKOTORYE METODY FUNKTSIONAL'NOGO ISSLEDOVANIIA SPORTSMENOV]
R SVANISHVILI Tbilisi, Izdatel'stvo Sabchota Sakartvelo, 1984, 152 p In Russian refs

Problems of functional examination in sports medicine are examined, taking into account athletic specialization and the nature of the training The hemodynamic, cardiodynamic, vegetative-nervous, and neuromuscular functional indices of athletes in a state of rest are examined Also considered are features characterizing the physiological adaptation of athletes to dynamic factors, attention is given to a combined functional test of the cardiovascular system, cardiodynamics during physical exercise, and physical work capacity B J

A85-42485#
STUDIES OF INFRA-THERMOGRAM OF THE HEAD AND NECK
C PANG, H -Y SUN, and S -Y CHANG Chinese Journal of Space Sciences, vol 5, Jan 1985, p 53-58 In Chinese, with abstract in English refs

The characteristics of the skin temperature distribution in the head and neck regions under two different air temperatures are researched According to the degree of the effects of air temperature on them, the distribution in the head and neck regions can be divided into thermostable and thermolabile areas Digital image displays of temperature show skin temperature in irregular and large lumped or small scattered distributions. The latter condition more often occurred under the air temperature of 20 C Statistical measures show that mean skin temperature under higher air temperature has the following features the temperature of the frontal part is higher, that of the lateral part is moderate, while that of the back part is lower When the air temperature was lowered, the differences among these parts did not remain Author

A85-42529
PHYSIOLOGICAL ADAPTATIONS TO AEROBIC TRAINING
E R NADEL (Yale University, New Haven, CT) American Scientist (ISSN 0003-0996), vol 73, July-Aug 1985, p 334-343 refs

Physiological factors which increase physical endurance are discussed Fatigue occurs in slow twitch muscle fibers as they become depleted of their glycogen reserves Constant regeneration of adenosine triphosphate (ATP), from which muscle energy is released by hydrolysis, powers sustained muscular exertion

Re-energization is accomplished by delivering sufficient oxygen to the ATP breakdown product, adenosine diphosphate (ADP) Complete depletion of the ATP supply is inhibited by a build-up of anaerobic byproducts, which lower the muscle pH values Extramuscular substrates cannot be used as reservoirs fast enough to offset fatigue in prolonged exercise Daily physical activity enhances the ability to deliver oxygen through increased pulmonary ventillation rates. The oxygen supply can then, at 50 percent maximum power, keep the muscle reactions completely aerobic Data indicate that the functions of all physiological systems related to resistance to fatigue are altered by regular, strenuous physical exercise The most significant change is increased blood volume, which benefits several bodily functions related to maintaining power output M S K

A85-42634
THE STATE OF LIPID PEROXIDATION AND THE THYMUS-DEPENDENT IMMUNITY SYSTEM IN PATIENTS WITH ALLERGIC DISEASES OF THE RESPIRATORY ORGANS DURING REHABILITATION IN A MOUNTAIN CLIMATE [SOSTOIANIE PEREKISNOGO OKISLENIIA LIPIDOV I TIMUSZAVISIMOI SISTEMY IMMUNITETA U BOL'NYKH ALLERGICHESKIMI ZABOLEVANIIAMI ORGANOV DYKHANIIA PRI REABILITATSII V USLOVIIAKH GORNOGO KLIMATA]
D A SUTKOVOI, G P KRAVCHUK, V A BARABOI, and P V BELOSHITSKII (AN USSR, Institut Fiziologii, Kievskii Institut Otolaringologii, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev) (ISSN 0201-8489), vol 31, May-June 1985, p 287-291 In Russian refs

A85-43101
CORONARY CIRCULATION OF THE HEALTHY MAN EXPOSED TO TILT TESTS, LBNP, AND HEAD-DOWN TILT
V E KATKOV, V V CHESTUKHIN, and L I KAKURIN (Nauchno-Issledovatel'skii Institut Transplantologii i Iskusstvennykh Organov, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, Aug 1985, p 741-747 refs

The effect of tilt (head-up and head-down) tests, LBNP tests, and 7-d head-down tilt (at -15 deg) on coronary circulation was investigated in healthy male volunteers. Catheters were implanted into the coronary sinus and brachial artery The Glanz catheter in the coronary sinus was used to measure volume flow in the area (constant thermodilution), pressure, and to withdraw samples of outflowing blood for biochemical analysis (acid-base equilibrium and oxygenation) Transfer from supine to upright body position, lower body negative pressure (-30 mm Hg for 20 min), as well as 15 deg head-down (by day 5-6) produced similar changes in the basic parameters of coronary circulation-reduction of blood flow and oxygen consumption, decrease of pressure in the coronary sinus, and increase of coronary resistance Transfer from head-up to head-down position caused opposite changes of the above parameters The changes in coronary circulation were adequate for myocardial metabolic requirements since the biochemical composition of the outflowing blood remained essentially constant during the gravitational exposures described Author

A85-43103
COMPARATIVE STUDY OF PHYSICAL AND MENTAL INCAPACITIES AMONG PORTUGESE AIRLINE PILOTS UNDER AND OVER AGE 60
A CASTELO-BRANCO, A CABRAL-SA, and J C BORGES (TAP Air Portugal, Lisbon, Portugal) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, Aug 1985, p 752-757 refs

The number of definitive flight incapacitations and deaths which occured between 1945 and 1983 among Portugese airline pilots age 60 or older (group of 28) were compared with the data for the pilots under 60 (group of 408) The comparisons were made according to results of medical (cardiovascular, metabolic, osteomuscular, urologic, ophthalmologic, respiratory, and other syndromes) and psychological (psychomotor efficiency, intellectual efficiency, personal structure, and signs of involution) examinations There were 21 cases of death and incapacities in the younger groups through accidents and unforeseen severe diseases while in the group of 60 and over, the ten incapacities found resulted from slow chronic degenerative disorders, with association of both chronic physical and psychic involution The remaining 18 pilots over 60 (64 percent) were perfectly fit for flight duties. I S

A85-43104
EFFECT OF DIFFERENT ASCENT PROFILES ON PERFORMANCE AT 4,200 M ELEVATION
P J G FORSTER (Royal Liverpool Hospital, England) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, Aug 1985, p 758-764 refs

Two groups of sea level residents were studied at the summit of Mauna Kea (4,200 m elevation) following ascent by vehicle 'Commuters' spent 6 h at the summit, while 'shiftworkers' lived on the mountain for 5 d Although PaO2 levels were lower in commuters, they experienced fewer altitude sickness symptoms than shiftworkers on the first day at 4,200 m After 5 d, shiftworkers reported fewer symptoms and performed better at tests of numerate memory and psychomotor ability than commuters At high altitude, pulse rates were increased in both groups, but only shiftworkers exhibited an elevation in systemic blood presssure Arterial-alveolar oxygen tension gradients were not increased at 4,200 m Despite frequent and rapid ascents and descents, with minimal provision for acclimatization, high altitude pulmonary and cerebral oedemas were uncommon Author

A85-43105
VOLUNTARY DEHYDRATION AND ELECTROLYTE LOSSES DURING PROLONGED EXERCISE IN THE HEAT
L E ARMSTRONG, R W HUBBARD, P C SZLYK, W T MATTHEW, and I V SILS (U S Army, Research Institute of Environmental Medicine, Natick, MA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, Aug 1985, p 765-770 refs

A85-43107
THE EFFECTS OF TTS-SCOPOLAMINE, DIMENHYDRINATE, LIDOCAINE, AND TOCAINIDE ON MOTION SICKNESS, VERTIGO, AND NYSTAGMUS
I PYYKKO (Institute of Occupational Health, Helsinki, Finland), S PADOAN (Kristianstad, Central Hospital, Sweden), L SCHALEN, M MAGNUSSON, N G HENRIKSSON (Lund, University Hospital, Sweden) et al Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, Aug 1985, p 777-782 refs

Experimentally induced vertigo (by calorization of the ears), nausea (by Coriolis maneuver), and nystagmus during the tests were significantly reduced by administering TTS-scopolamine (transdermally, 10 micrograms/h) and dimenhydrinate (orally, 100 mg) to healthy human subjects Lidocaine (administered i v to the ave plasma conc of 6 mol/1 and tocainide (i v to ave conc of 20 mol/L) had no effect on vertigo, nausea, or rotation-induced nystagmus, although these drugs reduced the caloric nystagmus The efficiency of TTS-scopolamine ann of dimenhydrinate on alleviation the motion sickness syndrome is explained by their targeting cells in the vestibular nuclei and reducing the neuron activity I S

N85-30584# Joint Publications Research Service, Arlington, Va
DEVELOPMENT OF GUIDELINES FOR SETTING PHYSIOLOGICAL AND HYGIENIC STANDARDS FOR NOISE LEVELS IN AEROSPACE MEDICINE
Y V KRYLOV *In its* USSR Rept Space Biol and Aerospace Med , Vol 18, No 5, Sep -Oct 1984 p 1-8 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep -Oct 1984 p 4-7
Avail NTIS HC A08

The development of the physiologic and hygienic principles of noise standardization in aerospace medicine is described The contribution of aerospace medicine to the theory of noise standardization is emphasized Also discussed are principles of standardization with respect to noise equivalent levels, dose-based standardization, as well as noise tolerance related to the work

load Further studies are needed to assess the applicability of the above principles for the evaluation of noise effects onboard flying vehicles Author

N85-30585# Joint Publications Research Service, Arlington, Va
COSMONAUTS' POSTURAL REACTIONS AFTER LONG-TERM MISSIONS ABOARD SALYUT-6 ORBITAL STATION
V V KALINICHENKO and A F ZHERNAVKOV *In its* USSR Rept Space Biol and Aerospace Med , Vol 18, No 5, Sep -Oct 1984 p 9-13 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep -Oct 1984 p 7-10
Avail NTIS HC A08

Tilt tests were used to study changes in cardiovascular responses to ortho- and antiorthostasis of four cosmonauts after their 96- and 140-day flights onboard Salyut-6 Preflight the cosmonauts were exposed to head-up and head-down tests in order to facilitate their readaptation to weightlessness Postflight all cosmonauts exhibited a better cardiovascular capability to counteract cranial blood redistribution during antiorthostatic tilt tests This can be considered as a result of their adaptation to weightlessness After flight every crewmember showed a significant decrease of orthostatic tolerance One of the factors responsible for the lower orthostatic tolerance is assumed to be inactivity of the vascular tone mechanisms It is suggested that their better stimulation before reentry may improve the efficacy of countermeasures against postflight orthostatic disorders Author

N85-30588# Joint Publications Research Service, Arlington, Va
POSITIVE GZ ACCELERATIONS TOLERANCE OF INDIVIDUALS 41 TO 58 YEARS OF AGE
V Y LUKYANYUK *In its* USSR Rept Space Biol and Aerospace Med , Vol 18, No 5, Sep -Oct 1984 p 26-33 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep -Oct 1984 p 18-23
Avail NTIS HC A08

Forty-five men (non-pilots) aged 41-58 were used to study their tolerance to +Gz acceleration The test subjects were either healthy people or showed atherosclerotic symptoms During centrifugation the test subjects had no anti-G suits on Healthy test subjects exhibited high tolerance to +Gz acceleration of up to 5 g in most centrifugal runs (90 3%) The test subjects with early atherosclerotic changes showed a significantly lower tolerance as compared to the matched controls It was found that in the atherosclerotic subjects tolerance to +Gz acceleration decreased as its value increased and as the number of atherosclerotic symptoms grew The major symptoms that limited tolerance to +Gz acceleration in all the test subjects were cardiac arrhythmias and in the atherosclerotic subjects they were also eye disorders and autonomic vascular reactions during recovery Author

N85-30589# Joint Publications Research Service, Arlington, Va
EFFECT OF 120-DAY ANTIORTHOSTATIC BEDREST ON GAS EXCHANGE AND PULMONARY CIRCULATION IN MAN
V Y VOROBYEV, V R ABDRAKHMANOV, A P GOLIKOV, L L STAZHADZE, I B GONCHAROV, I V KOVACHEVICH, S G VORONINA, and A V VABISHCHEVICH *In its* USSR Rept Space Biol and Aerospace Med , Vol 18, No 5, Sep -Oct 1984 p 34-38 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep -Oct 1984 p 23-26
Avail NTIS HC A08

Parameters of gas exchange and pulmonary circulation were measured in five healthy test subjects during 120 day head down tilt test and early recovery During the first half of the bed rest study CO2 tension in arterial blood increased significantly During the second half of the study oxygen and carbon dioxide tension decreased significantly The mechanisms of these changes are discussed Author

N85-30590# Joint Publications Research Service, Arlington, Va
REGIONAL CIRCULATION DURING TESTING ON ISOKINETIC DYNAMOMETER FOLLOWING 14-DAY BEDREST
T D VASILYEVA, V R VYSOTSKAYA, and G I GEVLICH *In its* USSR Rept Space Biol and Aerospace Med , Vol 18, No 5, Sep -Oct 1984 p 39-44 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep -Oct 1984 p 26-30
Avail NTIS HC A08

Time-course variations in regional circulation during isometric and isokinetic loads of varying intensity were measured after 14 day head down tilt It was found that pulse blood filling of the leg decreased and its vascular response to the load varied These findings suggest that the impairment of the strength-velocity properties of muscle after hypokinesia is associated not only with their morphological changes but also with their inadequate blood supply during loading Author

N85-30597# Joint Publications Research Service, Arlington, Va
NATURE OF POSTURAL CHANGES IN HUMAN HEMODYNAMICS WITH INTAKE OF SYDNOCARB ALONE AND IN COMBINATION WITH OBSIDAN
A Y MODIN, V I SOKOLOV, N V DEGTERENKOVA, V S SHASHKOV, and V A GORNAGO *In its* USSR Rept Space Biol and Aerospace Med , Vol 18, No 5, Sep -Oct 1984 p 82-86 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep -Oct 1984 p 54-58
Avail NTIS HC A08

Experiments were carried out to study the effect of sydnocarb 3-Beta-phenylisopropyl)-N-phenylcarbamoyl-sydnonimine), a stimulant of mental and physical performance, and its combination with obsidan, a Beta-adrenoblocking agent, on the central and peripheral hemodynamics during a head up test (+75 deg) after a 6 hour head down tilt (-15 deg) Sydnocarb increased the tone of brain and leg arterioles, left unchanged stroke volume and cardiac output, and decreased the postural increment of heart rate Sydnocarb (15 mg) combined with obsidan (20 mg) reduced heart rate and its postural increment, increased stroke volume, and increased the tone of resistive vessels, as was also the effect of sydnocarb taken separately Author

N85-30598# Joint Publications Research Service, Arlington, Va
CIRCADIAN DYNAMICS OF POTASSIUM EXCRETION IN URINE AS RELATED TO WORKING ON ONE AND TWO SHIFTS
A I SHCHUKIN *In its* USSR Rept Space Biol and Aerospace Med , Vol 18, No 5, Sep -Oct 1984 p 87-92 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep -Oct 1984 p 58-62
Avail NTIS HC A08

Four groups of men aged 19 to 20 years old were examined Group 1 and 3 subjects had worked for 1 or 2 years, in the day shift only Group 2 and 4 subjects worked for 1 or 2 years in the day and night shifts, the shift alternating every week The day shift was from 8 00 a m to 5 00 p m and the night shift was from 5 00 p m to 1 00 a m Group 1, 3 and 4 subjects were examined once, and Group 2 subjects twice (after the day and night shifts) An analysis showed that the day shift in both groups had an early increase in potassium excretion The shift transition changed from the daily maximum toward later hours As compared to the one shift work, the two shift work increased the amplitude of the diurnal potassium excretion This is considered to be the stressful effect of the two shift work This effect was very distinct after a week of the day shift work It is recommended that to assess the physiological effects of the two shift work, and daily variations in renal potassium excretion, should be examined after the day shift work E A K

N85-30599# Joint Publications Research Service, Arlington, Va
INVESTIGATION OF BIOCHEMICAL AND PSYCHOLOGICAL PARAMETERS OF AIR TRAFFIC CONTROLLERS IN PRESTART STATE BEFORE BEGINNING TO WORK
Y L KAN, O O MALINOVSKAYA, V A KUPRIYANOV, and A F DENISOV *In its* USSR Rept Space Biol and Aerospace Med, Vol. 18, No 5, Sep-Oct 1984 p 93-100 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep-Oct 1984 p 62-68
Avail. NTIS HC A08

The biochemical parameters, renal excretion of catecholamines, lipid metabolism, cholinesterase activity in blood, excretion of sodium and potassium in the saliva, and psychological parameters attention concentration, anxiety, rate of information processing of air controllers were determined immediately before their work shift It is found that parameters are significantly changed before commencing work E A K

N85-30604# Joint Publications Research Service, Arlington, Va
BLOOD SERUM ENZYME ACTIVITY FOLLOWING LONG TERM SPACEFLIGHTS
I A POPOVA, Y G VETROVA, and T Y DROZDOVA *In its* USSR Rept Space Biol and Aerospace Med, Vol 18, No 5, Sep-Oct 1984 p 122-124 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep-Oct 1984 p 81-82
Avail NTIS HC A08

At the present time there is much information about changes in blood enzyme activity in people with different states of stress, such as maximum physical loads, gravitational accelerations, hypodynamia, etc A change in blood serum enzyme spectrum is expected as an after effect of spaceflight Preliminary analysis of the results of each of the 5 main missions (MM) of the Salyut-6 scientific orbital space complex failed to reveal a definite correlation between duration of the missions (from 73 to 185 days) and tendency toward change in enzyme activity The tests were combined covering all of the main missions, which are viewed as long-term spaceflights for analysis The patterns of enzymatic reactions of the body to spaceflight conditions were assessed B W

N85-30618* National Aeronautics and Space Administration Langley Research Center, Hampton, Va
METHOD FOR THERMAL MONITORING SUBCUTANEOUS TISSUE Patent
J S HEYMAN and G H BRANDENBURGER, inventors (to NASA) (Virginia Associated Research Center) 30 Apr 1985 6 p Filed 22 Feb 1984 Sponsored by NASA
(NASA-CASE-LAR-13028-1, US-PATENT-4,513,750, US-PATENT-APPL-SN-582492, US-PATENT-CLASS-128-660, US-PATENT-CLASS-128-736, US-PATENT-CLASS-374-117, US-PATENT-CLASS-374-160) Avail US Patent and Trademark Office CSCL 06B

A noninvasive accurate method for measuring the temperature of tissue beneath the surface of a living body is described Ultrasonic signals are directed into beads of a material that are inserted into the tissue with a syringe. The reflected signals indicate the acoustic impedance or resonance frequency of the beads which in turn indicates the temperature of the tissue A range of temperatures around the melting temperature of the material can be measured by this method
Official Gazette of the U S Patent and Trademark Office

N85-30619*# Research Triangle Inst, Research Triangle Park, N C Biomedical Applications Team
APPLICATIONS OF AEROSPACE TECHNOLOGY IN BIOLOGY AND MEDICINE Final Report, 1 Jan. 1982 - 28 Feb. 1983
D ROUSE Mar 1983 120 p refs
(Contract NAS1-16177)
(NASA-CR-166100, NAS 1 26 166100) Avail NTIS HC A06/MF A01 CSCL 06E

Utilization of NASA technology and its application to medicine is discussed The introduction of new or improved commercially available medical products and incorporation of aerospace technology is outlined A biopolar donor-recipient model of medical technology transfer is presented to provide a basis for the methodology The methodology is designed to (1) identify medical problems and NASA technology that, in combination, constitute opportunities for successful medical products, (2) obtain the early participation of industry in the transfer process, and (3) obtain acceptance by the medical community of new medical products based on NASA technology Two commercial transfers were completed the ocular screening device, a system for quick detection of vision problems in preschool children, and Porta-Fib III, a hospital monitoring unit Two institutional transfers were completed implant materials testing, the application of NASA fracture control technology to improve reliability of metallic prostheses, and incinerator monitoring, a quadrupole mass spectrometer to monitor combustion products of municipal incinerators Mobility aids for the blind and ultrasound diagnosis of burn depth are also studied E A K

N85-30620* National Aeronautics and Space Administration, Washington, D C
AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 272)
Jun 1985 102 p
(NASA-SP-7011(272), NAS 1 21 7011(272)) Avail NTIS HC $7 00 CSCL 06E

This bibliography lists 360 reports, articles, and other documents introduced into the NASA scientific and technical information system in May 1985 F M R

N85-30621*# Management and Technical Services Co, Houston, Tex
SPACE-FLIGHT SIMULATIONS OF CALCIUM METABOLISM USING A MATHEMATICAL MODEL OF CALCIUM REGULATION
S N BRAND 7 May 1985 36 p refs
(Contract NAS9-17151)
(NASA-CR-171883, NAS 1 26 171883, TIR-2114-MED-5016)
Avail NTIS HC A03/MF A01 CSCL 06P

The results of a series of simulation studies of calcium matabolic changes which have been recorded during human exposure to bed rest and space flight are presented Space flight and bed rest data demonstrate losses of total body calcium during exposure to hypogravic environments These losses are evidenced by higher than normal rates of urine calcium excretion and by negative calcium balances In addition, intestinal absorption rates and bone mineral content are assumed to decrease The bed rest and space flight simulations were executed on a mathematical model of the calcium metabolic system The purpose of the simulations is to theoretically test hypotheses and predict system responses which are occurring during given experimental stresses In this case, hypogravity occurs through the comparison of simulation and experimental data and through the analysis of model structure and system responses The model reliably simulates the responses of selected bed rest and space flight parameters When experimental data are available, the simulated skeletal responses and regulatory factors involved in the responses agree with space flight data collected on rodents In addition, areas within the model that need improvement are identified Author

N85-30622# Army Research Inst of Environmental Medicine, Natick, Mass
HEAT INJURY: PREVENTION IS THE KEY
L E ARMSTRONG and R W HUBBARD 2 Apr 1985 22 p
(AD-A153734, USARIEM-M-25/85) Avail NTIS HC A02/MF A01 CSCL 06N

This article deals with the two longest problems facing runners today dehydration and elevated rectal temperature Varieties of heat injuries are described and responsibility for prevention of heat injury is discussed The effectiveness of showers and fine-mist sprays in cooling runners is disputed Race directors can postpone or cancel races and, thus, have at their disposal the most effective means of stopping heat injury Runners, too, must take

precautionary measures during hot weather running and should reduce running pace if the signs of heat illness are present
GRA

N85-30623# Naval Health Research Center, San Diego, Calif
LONGITUDINAL STUDY OF CARDIOVASCULAR DISEASE IN US NAVY PILOTS Interim Report
A HOIBERG Feb 1985 16 p
(AD-A154331, NAVHLTHRSCHC-85-7) Avail NTIS HC A02/MF A01 CSCL 06E

This longitudinal study examined the consequences of cardiovascular disease (CVD) in 145 U S Navy pilots who suffered a CVD incident during the 1967 to 1979 time period Results showed that one pilot died (data were only available for 1974-79), one suffered a second myocardial infarction, and 28 pilots were hospitalized and/or retired with a physical disability because of CVD The other 79 3% of this pilot subpopulation continued on active duty, retired with no physical disability, or resigned from service The majority of subsequent CVD incidents occurred during a 12-month period after the initial CVD event, 35% had discontinued flying prior to the initial CVD incident These findings reflected not only the few CVD cases in this population of 22,245 pilots who served for some time from 1967 to 1979, but also the few after-effects of CVD
GRA

N85-30624# California Univ , Livermore Lawrence Livermore Lab Biomedical Sciences Div
MOUSE OOCYTE KILLING BY NEUTRONS: TARGET CONSIDERATIONS
T STRAUME and R I DOBSON Apr 1985 10 p refs Presented at the 9th Symp on Microdosimetry, Toulouse, 20-24 May 1985 Submitted for publication
(Contract W-7405-ENG-48)
(DE85-011362, UCRL-91593, CONF-850506-2) Avail NTIS HC A02/MF A01

Highly radiosensitive primordial mouse oocytes, the principal cells at genetic risk in the female, were studied using 0 43-MeV neutrons Analysis of the survival curve (D37 = 0 055 Gy) indicates that the diameter of the radiosensitive target (assumed spherical and of unit density) is larger than that of the nucleus but not of the oocyte, implicating a non-nuclear but sub-cellular target This is consistent with results from (3)H-thymidine incorporated in DNA Efforts to identify the extraordinarily radiosensitive lethality target in these primordial oocytes suggest it is the plasma membrane Monte Carlo calculations for 0 43-MeV neutrons show that at the D37 only a single proton recoil will traverse the plasma membrane, consistent with the observed exponential survival curve A highly sensitive non-DNA target for mouse oocyte killing may importantly influence interpretations of genetic mutation data from mice and their use in estimating genetic risk in humans
DOE

N85-30625# Los Alamos Scientific Lab , N Mex Experimental Pathology Group
FLOW CYTOMETRY FOR HEALTH MONITORING IN SPACE
J H JETT, J C MARTIN, C C SAUNDERS, and C C STEWART 1984 26 p refs Presented at the Lunar Bases and Space Activities of the 21st Century Conf , Washington, D C , Oct 1984
(Contract W-7405-ENG-36)
(DE85-009572, LA-UR-85-802, CONF-8410230-11) Avail NTIS HC A03/MF A01

Monitoring the health of space station or lunar base residents will be necessary to provide knowledge of the physiological status of astronauts Flow cytometric techniques are uniquely capable of providing cellular, chromosome, hormone level and enzyme level information The use of dye provides the basis for fluorescently labeling specific cellular components Laser induced fluorescence from stained cells is quantitated in a flow cytometer to measure cellular components such as DNA, RNA and protein One major application of a flow cytometer is to perform a complete blood count including hematocrit, hemoglobin content, and numbers of platelets, erythrocytes, granulocytes, lymphocytes and monocytes A newly developed flow cytometry based fluoroimmunoassay measures levels of serum enzymes and hormones It also quantitates radiation exposure and some forms of chromosome damage with flow cytometric measurements
DOE

N85-31787# Joint Publications Research Service, Arlington, Va
H1-NMR STUDIES ON LYMPHOCYTE MEMBRANES IN HUMAN LYMPHOPROLIFERATIVE DISEASES Abstract Only
V Y YUSHMANOV, Y A KURUSHIN, I N KOGARKO, L A SIBELDINA, R A MOKEYEVA, and Y A LUKINA *In its* USSR Rept Life Sci Biomed and Behavioral Sci (JPRS-UBB-85-017) p 31 7 Jun 1985 Transl into ENGLISH from Biol Membrany (Moscow), v 2, no 2, Feb 1985 p 170-175
Avail NTIS HC A07/MF A01

Nuclear Magnetic Resonance (NMR) high resolution studies were conducted on lymphocytes derived from normal control subjects and from patients with lymphoblastic leukemia, lymphoma, paroxysmal renal hemoglobinuria, and myocarditis, to assess the suitability of this technology for differential diagnosis The spectra of the plasma membranes obtained at 250 and 360 MHz indicated that the lipid components possessed relatively high mobility The spectral features of the control and leukemic lympyhocytes were nonoverlapping, based on comparison of signal intensities and spin-lattice relaxation times of methyl and methylene fatty acid protons and the methyl protons of the polar phosphatidylcholine heads The data were interpreted to indicate that the differences were due either to a change in the content of various phospholipids in the lymphoproliferative cells, or to altered protein-lipid interactions It appears, therefore that high resolution NMR may be useful in analysis of transformed lymphocytes and, by extension, in the differential diagnosis of lymphoproliferative disorders
R J F

N85-31789# Joint Publications Research Service, Arlington, Va
PHENOMENON OF UNIVERSAL ROSETTE-FORMING CELL STIMULATION BY EXTREME STRESS Abstract Only
I V PETROVA, S N KUZMIN, T S KURSHAKOVA, R S SUZDALNITSKIY, V A LEVANDO, and B B PERSHIN *In its* USSR Rept Life Sci Biomed and Behavioral Sci (JPRS-UBB-85-017) p 94 7 Jun 1985 Transl into ENGLISH from Zh Mikrobiol Epidemiol i Immunobiol (Moscow), no 2, Feb 1985 p 72-76
Avail NTIS HC A07/MF A01

Immunity factors were analyzed in highly trained 18 to 21 year old athletes subjected to extreme physical and emotional stress Extreme stress situations were found to be without effect on the levels of immunocompetent cells and cells responsible for nonspecific immunity However, the stressful states depressed the percentage of phagocytically active neutrophils, salivary lysozyme activity (without affecting blood lysozyme activity), and depressed immunoglobulin concentrations The singularly most impressive effects of extreme stress consisted of pronounced (p 0 0001) elevations of universal rosette-forming lymphocytes and neutrophils vis-a-vis unstressed control subjects The phenomenon of the universal rosette-forming cells may account for the depletion of immunoglobulins, by assuming that a portion of the circulating immunoglobulins were bound to the surface of these cells due to hormonal and other factors
Author

N85-31791# Joint Publications Research Service, Arlington, Va
ANATOMY OF STRESS Abstract Only
A RYLOV *In its* USSR Rept Life Sci Biomed and Behavioral Sci (JPRS-UBB-85-017) p 95 7 Jun 1985 Transl into ENGLISH from Znaniye-Sila (Moscow), no 2, Feb 1985 p 17-19
Avail NTIS HC A07/MF A01

The now widely accepted theory holds that human and animal behavior is directed at securing some useful adaptational goals, and that to attain such a positive result temporary functional associations are formed between certain brain structures and various organs, referred to as functional systems Imbalance in such systems or failure to achieve an efficient functional system is the cause of stress Much data was presented at the conference in support of this theory and its further development Of particular interest were data on the fact that most damage is sustained by

those organs that received the greatest functional challenge For example, monkeys terrified while eating developed gastric ulcers, while others developed hypertension under the influence of a similar stimulus presented during a non-eating period R J F.

N85-31792# Joint Publications Research Service, Arlington, Va
ACCLIMATIZATION TO FAR NORTH Abstract Only
Y ASAKOVA *In its* USSR Rept Life Sci Biomed and Behavioral Sci (JPRS-UBB-85-017) p 96 7 Jun 1985 Transl into ENGLISH from Trud (Moscow), 19 Mar 1985 p 3
Avail NTIS HC A07/MF A01

It is recommended that persons over 35 years of age and those with chronic diseases should not relocate to the far north It is argued that persons from Caucasus, Central Asia, the Ukraine and Baltic region adapt best to conditions of the far north The health and physical and psychological hazards of the magnetic storms, long polar nights, and air and abrupt pressure drops encountered in the far north are discussed, as well as the aggravation of some physical and pathological conditions which might be expected because of these natural phenomena The use of long-range predictions of magnetic storms is advised for medical purposes R J F

N85-31794*# Management and Technical Services Co , Houston, Tex
A SYSTEMS ANALYSIS OF THE ERYTHROPOIETIC RESPONSES TO WEIGHTLESSNESS. VOLUME 1: MATHEMATICAL MODEL SIMULATIONS OF THE ERYTHROPOIETIC RESPONSES TO WEIGHTLESSNESS
J I LEONARD May 1985 166 p refs 2 Vol
(Contract NAS9-17151)
(NASA-CR-171890, NAS 1.26.171890, TIR-2114-MED-5003)
Avail NTIS HC A08/MF A01 CSCL 06P

Theoretical responses to weightlessness are summarized. The studies include development and validation of a model of erythropoiesis regulation, analysis of the behavior of erythropoiesis under a variety of conditions, simulations of bed rest and space flight, and an evaluation of ground-based animal studies which were conducted as analogs of zero-g A review of all relevant space flight findings and a set of testable hypotheses which attempt to explain how red cell mass decreases in space flight are presented An additional document describes details of the mathematical model used in these studies. Author

N85-31795*# Management and Technical Services Co , Houston, Tex
A SYSTEMS ANALYSIS OF THE ERYTHROPOIETIC RESPONSES TO WEIGHTLESSNESS. VOLUME 2: DESCRIPTION OF THE MODEL OF ERYTHROPOIESIS REGULATION. PART A: MODEL FOR REGULATION OF ERYTHROPOIESIS. PART B: DETAILED DESCRIPTION OF THE MODEL FOR REGULATION OF ERYTHROPOIESIS
J I LEONARD May 1985 31 p refs 2 Vol
(Contract NAS9-17151)
(NASA-CR-171891, NAS 1 26 171891,
TIR-2114-MED-5004-VOL-2) Avail NTIS HC A03/MF A01
CSCL 06P

A mathematical model of the erythropoiesis on total red blood cell mass is presented The loss of red cell mass has been a consistent finding during space flight Computer simulation of this phenomenon required a model that could account for oxygen transport, red cell production, and red cell destruction The elements incorporated into the feedback regulation loop of the model are based on the accepted concept that erythrocyte production is governed by the balance between oxygen supply and demand in the body The mechanisms and pathways of the control circuit include oxygenation of hemoglobin and oxygenation of tissues by blood transport and diffusional processes Other features of the model include a variable oxygen-hemoglobin affinity, and time delays which represent time for erythropoietin (erythrocyte-stimulating hormone) distribution in plasma, and time for maturation of the erythrocytes in bone marrow F M R

N85-31796*# Management and Technical Services Co , Houston, Tex
AN INTEGRATED ANALYSIS OF THE PHYSIOLOGICAL EFFECTS OF SPACE FLIGHT: EXECUTIVE SUMMARY
J I LEONARD 1985 41 p
(Contract NAS9-17151, NAS9-15487, NAS9-16328, NAS9-15850)
(NASA-CR-171892, NAS 1 26 171892, TIR-2114-MED-5009)
Avail NTIS HC A03/MF A01 CSCL 06S

A large array of models were applied in a unified manner to solve problems in space flight physiology Mathematical simulation was used as an alternative way of looking at physiological systems and maximizing the yield from previous space flight experiments A medical data analysis system was created which consist of an automated data base, a computerized biostatistical and data analysis system, and a set of simulation models of physiological systems Five basic models were employed (1) a pulsatile cardiovascular model, (2) a respiratory model, (3) a thermoregulatory model, (4) a circulatory, fluid, and electrolyte balance model, and (5) an erythropoiesis regulatory model Algorithms were provided to perform routine statistical tests, multivariate analysis, nonlinear regression analysis, and autocorrelation analysis Special purpose programs were prepared for rank correlation, factor analysis, and the integration of the metabolic balance data E R

N85-31797# Army Test and Evaluation Command, Aberdeen Proving Ground, Md
TOXIC HAZARDS TESTS FOR VEHICLES AND OTHER EQUIPMENT Test Operations Procedure
14 Dec 1984 25 p Supersedes TOP-2-2-614
(AD-A149164, TOP-2-2-614, TOP-2-2-614-REV) Avail NTIS HC A02/MF A01 CSCL 06T

This Test Operations Procedure (TOP) describes tests to measure certain toxic-gas and toxic-metal concentrations produced during the operation of equipment, such as the firing of vehicle armament and the operation of engines, fuel-fired personnel heaters, and other fuel-burning equipment (e g , generators, compressors) Topics include Contaminants (Toxic Hazards) Summary, Carbon monoxide, Ammonia, Sulfur dioxide, Oxides of nitrogen, and Lead, Instrumentation -Continuous-reading instrumentation, Colorimetric methods, Gravimetric methods, and Instrument selection, Required Test Conditions -- All test items, and Preparation of test item, Test Procedures -- Weapons (gun and rocket related), and Vehicles and other fuel-burning equipment, Data Presentation -- Exposure limits, Test results, and Methods of computation, Appendices -- Standards, and Procedures for testing for lead, copper, and other metal concentrations during weapon firing tests GRA

N85-31798# Stockholm Univ (Sweden) Inst of Theoretical Physics
ZINC: BIOLOGICAL EFFECTS. FACTS AND FICTION
T BERGLUND Sep 1984 496 p refs Sponsored by Swedish Work Environment Fund
(USIP-84-12) Avail NTIS HC A21/MF A01

Zinc passage across the surface of the human body and body zinc distribution, zinc and the body fluids, zinc effects on soft tissues and hard tissues, zinc and the cell, and zinc physiology and biochemistry are discussed Author (ESA)

N85-31799# Institut de Mecanique des Fluides de Toulouse (France) Groupe de Rheologie
A TWO PHASE FLOW MODEL AT THE LEVEL OF A NARROWING SECTION [MODELE D'ECOULEMENT DIPHASIQUE AU NIVEAU D'UN RETRECISSEMENT DE SECTION]
J P BITOUN, P BOYER, D P LY, and D BELLET 1983 6 p In FRENCH Presented at CNRS RCP 619 Congr Innovation et Technol en Biol et Med (ITBM)
Avail: NTIS HC A02/MF A01

The flow of blood suspensions in the narrow section of a glass tube is studied The fluid has a highly viscous central phase containing a high concentration of red blood cells and a peripheral

phase composed mainly of less viscous plasma A perturbation method is used as well as a video technique for flow visualization It is shown that the separation between phases is progressive The validity of the visualization method is emphasized
Author (ESA)

N85-31800# Oesterreichisches Forschungszentrum Seibersdorf G m b H , Vienna
THE DNA METABOLISM AND POLY-(ADP-RIBOSE) SYNTHESIS IN LYMPHOCYTES OF PERSONS EXPOSED TO LOW DOSES OF IONIZING RADIATION
W KLEIN, F KOCSIS, and A TOPALOGLOU Jan 1985 17 p refs In GERMAN, ENGLISH summary
(OEFZS-4307, BL-496/85) Avail NTIS HC A02/MF A01

The effects of ionizing radiation on the genotype of human lymphocytes are studied to estimate the risks on the organism The blood of 22 healthy persons exposed to increased radiation was monitored Accumulated doses, increased in time, have an effect on the semiconservative DNA synthesis and on in vitro nonscheduled DNA synthesis The correlation between nucleoside sedimentation and the increased dose of ionizing radiation is shown in vivo but not in vitro There is no correlation with poly-(ADP-ribose)-synthesis Though the experimental doses are under the limit values of radiation exposure at work the significant changes in the lymphocyte genotype suggest an increased risk of delayed damage
Author (ESA)

N85-31801# Southampton Univ (England) Inst of Sound and Vibration Research
AUDITORY IMPAIRMENT AND THE ONSET OF DISABILITY AND HANDICAP IN NOISE-INDUCED HEARING LOSS
D W ROBINSON, P A WILKINS, N J THYER, and J F LAWES Nov 1984 187 p refs
(ISVR-TR-126) Avail NTIS HC A09/MF A01

Subjects with mild degrees of noise induced hearing loss were studied to identify measurable characteristics of hearing that identify the points of onset of hearing disability (defined as difficulty in hearing speech in various circumstances) and of hearing handicap (defined as perceived social disadvantage resulting from the hearing loss) An onset point for disability is identified as 30 dB hearing threshold level, average over 1, 2, and 3 kHz In the case of handicap, there is a continuous trend starting from normal hearing with no definable threshold of onset
Author (ESA)

N85-31802# Politecnico di Torino (Italy) Dipt di Ingegneria Aeronautica e Spaziale
DESIGN OF A PHYSICAL MODEL OF THE COCHLEA. DISPLACEMENT SENSOR FOR SMALL AMPLITUDES IN A HIGHLY VISCOUS LIQUID
C CANCELLI, S DANGELO, R MALVANO (CNR), and M MASILI Jan 1984 23 p refs In ITALIAN, ENGLISH summary Sponsored by CNR
(STN-6) Avail NTIS HC A02/MF A01

A model of the inner ear is described The 50 1 scale model contains all the elements of the cochlea cross section including the scalae timpani, the scalae vestibuli, the scalae media, the basilar membrane, the Reissner membrane, the tectorial membrane and the organ of Corti The reasons to partially reject the simplifications of the previous models and the criteria to assure the dynamic similarity of the model with the real cochlea are shown
Author (ESA)

N85-31803# Sira Inst Ltd , Chislehurst (England)
GAS ANALYSIS TECHNIQUES FOR HUMAN PHYSIOLOGICAL MEASUREMENTS IN SPACE Final Report
R J SIMPSON Paris ESA May 1984 61 p
(Contract ESA-5183/82/HP-NL)
(A/6537, ESA-CR(P)-2030) Avail NTIS HC A04/MF A01

An instrument to measure breath composition to derive physiological factors, to measure cardiac output, and to measure pulmonary diffusing capacity was developed A prototype which measures carbon dioxide, carbon monoxide, sulphur hexafluoride and Freon 22 concentrations by infrared absorption was constructed The instrument is compact and consumes 50 W Response time is longer than the 0 125 sec specified and could be reduced by modifying the design, but it is felt that the response time specification should be reexamined Features include robustness, absence of vibration, and the ability to calibrate the instrument using sealed gas cells
Author (ESA)

N85-31804# Interuniversitair Reactor Instituut, Delft (Netherlands) Stralingsbescherming sdienst
DOSIMETRY AND LIMIT VALUES FOR INTERNAL CONTAMINATION WITH RADIONUCLIDES: FROM (INTERNATIONAL COMMISSION ON RADIOACTIVE PROTECTION) ICRP-2 TO ICRP-30 [DOSIMETRIE EN LIMIETWAARDEN VOOR INWENDIGE BESMETTING MET RADIONUCLIDEN: VAN ICRP-2 NAAR ICRP-30]
C E RASMUSSEN Jul 1984 29 p refs In DUTCH, ENGLISH summary
(IRI-190-84-03, B8563196) Avail NTIS HC A03/MF A01

Dose calculations and protection norms concerning internal contamination with radionuclides are surveyed Values for the recommended limits on intake are proposed, and old and new annual limits on intake by inhalation and ingestion for 239 nuclides are compared
Author (ESA)

N85-31805# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France) Aerospace Medical Panel
RESULTS OF SPACE EXPERIMENTS IN PHYSIOLOGY AND MEDICINE AND INFORMAL BRIEFINGS BY THE F-16 MEDICAL WORKING GROUP
Loughton, England Mar 1985 162 p refs In ENGLISH and FRENCH Symp held in Istanbul, 25-27 Sep 1984
(AGARD-CP-377, ISBN-92-835-0376-7) Avail NTIS HC A08/MF A01

The French-Soviet Salyut 7, Shuttle and NASA/ESA Spacelab-1 missions and the results of space experiments in physiology and medicine are discussed The following topics were discussed the experience of a science astronaut on the Spacelab-1 mission, vestibular and sensorimotor responses to microgravity, cardiovascular responses, and sleep, immunological and radiobiological responses Selection procedures, centrifuge operations and training physical training and G tolerance, and several aeromedical problems associated with F-16 fighter aircraft operations are also discussed

N85-31806# Deutsche Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany) Inst fuer Flugmedizin
EVALUATION OF RESULTS OF SPACE EXPERIMENTS IN PHYSIOLOGY AND MEDICINE AND INFORMAL BRIEFINGS BY THE F-16 MEDICAL WORKING GROUP Technical Evaluation Report
K E KLEIN *In* AGARD Results of Space Expt in Physiol and Med and Informal Briefings by the F-16 Med Working Group 2 p Mar 1985
Avail NTIS HC A08/MF A01

The exploration of space exposes man to a unique environment since it contains features which do not exist naturally and can hardly be simulated on Earth Prominent in this respect is the relative absence of gravity which initiates changes in the human organism mainly through three modes of action the specific effects of gravity sensing organs, the lack of hydrostatic pressure affecting fluid compartments, and the reduction of deformation forces on load bearing tissues Data collected during previous space flights demonstrated that almost all physiological systems are affected by the space environment Some of the most significant changes which have become known so far involve the vestibular, the cardiovascular and the musculo-skeletal system as well as blood and metabolism Conclusions drawn from symposium proceedings are given Since pitch and roll in microgravity do not result in otolith displacement, a sensory rearrangement becomes necessary in which the CNS reinterprets all otolith outputs as linear motion (otolith tilt translation reinterpretation hypothesis) The inability of otoliths to provide information on spatial orientation of head and

body is compensated mainly by the increased utilization of visual cues Spaceflight related redistribution of EMG activities in muscles responsible for posture control occurs in agreement with changes in otolith function Space motion sickness is most likely provoked by sensory conflicts, in particular during pitch and roll motions, individual susceptibility still can not be predicted, however, the easiness of adaptation to head movements while wearing reversing prisms may be indicative in this respect For the time being, the mechanisms behind the unexpected finding of a caloric nystagmus in the absence of thermal convection during orbital flight remains inexplicable R J F

N85-31807# Deutsche Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany)
EXPERIENCE OF SCIENCE ASTRONAUT ON THE SPACELAB-1 MISSION
U MERBOLD *In* AGARD Results of Space Expt in Physiol and Med and Informal Briefings by the F-16 Med Working Group 7 p Mar 1985 refs
Avail NTIS HC A08/MF A01

The experience of a science astronaut on the Spacelab-1 mission is reported The flight performance, crew training, experiment control, and human physiology and immune system experiments are discussed R J F

N85-31808# Mainz Univ (West Germany) Dept of Physiology
THE EUROPEAN VESTIBULAR EXPERIMENTS OF THE SPACELAB-1 MISSION
R VONBAUMGARTEN, A BENSON (Royal Air Force Inst of Aviation Medicine), A BERTHOZ (CNRS, Paris), T BRANDT (Alfried-Krupp-Krankenhaus), U BRANDT, W BRUZEK (Tuebingen Univ), J DICHGANS (Tuebingen Univ), J KASS, T PROBST (Alfried-Krupp-Krankenhaus), H SCHERER (Klinikum Grosshadern) et al *In* AGARD Results of Space Expt in Physiol and Med and Informal Briefings by the F-16 Med Working Group 2 p Mar 1985
Avail NTIS HC A08/MF A01

The European vestibular experiments on Spacelab 1 were designed to explore vestibular adaptation to the space environment and readaptation to the ground by conducting a series of vestibular tests which were repeated several times at different stages before, during, and after the mission The tests included the threshold for linear oscillation, eye movements triggered by angular acceleration, optokinetic and caloric stimulation, and measurements of posture Slow phase velocity of caloric nystagmus was increasing in the course of the mission. The results of most tests could be interpreted as indicating a decreasing gain of CNS processing of otolithic information during vestibular adaptation to the space environment A series of vestibular tests were performed 120, 90, 60, 30 and 11 days before the Spacelab-1 mission and again during the first 6 days after recovery of the space craft Similar experiments were performed during the mission on board Spacelab by the red shift of the Spacelab scientific crew After our linear acceleration device Space Sled was descoped for the SL-1 mission and postponed to the D 1-mission a body restraint system (BRS) was constructed which allowed linear oscillation of the experimental subject in three different axes by hand operation of the operator The test subject wore a vestibular helmet, which contained the electroculography amplifiers and a device for insurflation of heated on cooled air into the ears during the caloric test An infrared sensitive camera (EMIR) ordered the movements of the right eye including eye rotation The EMIR system was computing the XY displacements of the eye for display on a stripchart recorder in the payload operation center In front of the left eye was a TV monitor mounted in a visor of the helmet for optokinetic stimulation, calibration and target cross resetting R J F

N85-31809# Royal Air Force Inst of Aviation Medicine, Farnborough (England)
SOME RESULTS OF THE EUROPEAN VESTIBULAR EXPERIMENTS IN THE SPACELAB-1 MISSION
A BENSON, R VONBAUMGARTEN (Mainz Univ), A BERTHOZ (CNRS, Paris), T BRANDT (Alfried-Krupp-Krankenhaus), U BRAND, W BRUZEK (Tuebingen Univ), J DICHGANS (Mainz Univ), J KASS (Alfried-Krupp-Krankenhaus), T PROBST (Klinikum Grosshadern), H SCHERER (CNRS, Paris) et al *In* AGARD Results of Space Expt in Physiol and Med and Informal Briefings by the F-16 Med Working Group 10 p Mar 1985 refs
Avail NTIS HC A08/MF A01

A series of experiments was performed during the flight of Spacelab 1 to explore changes in vestibular function and visual vestibular interactions associated with adaptation to microgravity Tests were also conducted on the ground during the four months before flight and over the six days post flight Measurements were made of the threshold for detection of linear oscillation and of vestibulo-ocular elicited by angular and linear accelerations and by optokinetic and caloric stimuli These revealed changes associated with the modified otolithic afference in microgravity, though the most unexpected finding was that caloric stimulation in orbital flight evoked nystagmus comparable to that obtained on Earth R J F

N85-31810*# National Aeronautics and Space Administration Johnson (Lyndon B) Space Center,
THRESHOLDS FOR DETECTION OF LINEAR OSCILLATION FOLLOWING PROLONGED WEIGHTLESSNESS
D E PARKER (Miami Univ, Oxford, Ohio), M F RESCHKE, A P ARROTT (Payload Systems, Inc), J L HOMICK, and B K LICHTENBERG (Payload Systems, Inc) *In* AGARD Results of Space Expt in Physiol and Med and Informal Briefings by the F-16 Med Working Group 4 p Mar 1985
Avail NTIS HC A08/MF A01 CSCL 06S

Linear self motion detection thresholds, which were recorded as part of the European vestibular Experiments, varied across subjects This variability is consistent with observations following the STS-8 and STS-11 Shuttle missions Three astronauts who participated in the STS-8 and STS-11 (41-B) missions served as subjects in this experiment Nominal amplituudes of parallel swing motion were determined by recording the displacement of a pointer attached to the swing bed relative to a scale taped to the floor These nominal amplitudes were compared with those determined with a three axis accelerometer and strip chart recorder The subject indicated his perception of self motion (yes or no) by manipulations of a joystick that was connected to one channel of the strip chart recorder A small signal lamp was mounted on an ear pad support and was controlled by the experimenter's hand held microswitch Prolonged weightlessness appeared to produce elevated self motion detection thresholds in one astronaut However, a similar threshold elevation was not obtained from the other two astronauts The basis for this discrepancy is unknown but it may be related to altered detection threshold criteria on the part of the astronaut who exhibited the threshold change Failure to record threshold changes following prolonged weightlessness is consistent with the researcher's otolith tilt translation reinterpretation hypothesis This hypothesis suggests that the sensitivity of the otolith receptors is not altered by weightlessness, rather the way in which the brain interprets otolith information is changed R J F

N85-31811# Massachusetts Inst of Tech, Cambridge Man-Vehicle Lab
SPATIAL ORIENTATION IN WEIGHTLESSNESS AND READAPTATION TO EARTH'S GRAVITY
L R YOUNG, D G D WATT (McGill Univ), C M OMAN, K F MONEY (Defence and Civil Inst of Environmental Medicine), and B K LICHTENBERG *In* AGARD Results of Space Expt in Physiol and Med and Informal Briefings by the F-16 Med Working Group 6 p Mar 1985 refs
Avail NTIS HC A08/MF A01

Unusual vestibular responses to head movements in weightlessness may produce spatial orientation illusions and

symptoms of space motion sickness An integrated set of experiments was performed during Spacelab 1, as well as pre and postflight, to evaluate otolith organ and semicircular canal mediated responses by a variety of measurements, including eye movements, postural control, perception of orientation and motion sickness susceptibility Author

N85-31812*# National Aeronautics and Space Administration Johnson (Lyndon B) Space Center,
REINTERPRETATION OF OTOLITH INPUT AS A PRIMARY FACTOR IN SPACE MOTION SICKNESS
M F RESCHKE, D E PARKER (Miami Univ , Oxford, Ohio), J L HOMICK, D J ANDERSON (Michigan Univ , Ann Arbor), A P ARROTT (Payload Systems, Inc), and B K LICHTENBERG (Payload Systems, Inc) *In* AGARD Results of Space Expt in Physiol. and Med and Informal Briefings by the F-16 Med Working Group 18 p Mar 1985 refs
Avail NTIS HC A08/MF A01 CSCL 06S

It is hypothesized that exposure to prolonged free fall is a form of sensory/motor rearrangement rather than a direct change in otolith sensitivity or sensory compensation for a reduced otolith input The rearrangement of stimuli will force a new interpretation by the CNS of otolith input This reinterpretation is necessary for a structured and meaningful interaction with the new environment Data from two flight experiments are presented which support an otolith reinterpretation hypothesis The first experiment measured vestibulo-spinal reflex changes as a function of sustained free fall Findings indicate that when a monosynaptic reflex (H-reflex), measured from the major postural muscles (soleus), is used adaptation to space flight includes a change in how the CNS interprets a fall In a normal gravity environment a sudden unexpected fall will produce a potentiated H reflex After seven days in flight an equivalent fall does not potentiate the reflex During postflight a greatly increased reflex is observed in those crewmen most susceptible to space motion sickness In the second experiment self motion perception and torsional eyemovements were modified as a function of exposure to sustained free fall Preflight roll motion (about the X axis) was perceived as pure roll, and the eye movements recorded were countertorsional Postflight, roll stimulation was perceived as linear translation (side to side movement) with a small angular motion component Eye movement measurements confirmed significantly more horizontal motion
G L C

N85-31813# Centre National de la Recherche Scientifique, Paris (France) Lab de Physiologie Neurosensorielle
POSTURAL ADJUSTMENTS ASSOCIATED WITH ARM MOVEMENTS IN WEIGHTLESSNESS [AJUSTEMENTS POSTURAUX ASSOCIES AU MOUVEMENT DU BRAS EN APESANTEUR]
F LESTIENNE and G CLEMENT *In* AGARD Results of Space Expt in Physiol and Med and Informal Briefings by the F-16 Med Working Group 8 p Mar 1985 refs In FRENCH
Avail NTIS HC A08/MF A01

Postural adaptation associated with voluntary arm movement was studied in two subjects in the course of one seven day flight In weightlessness, a redistribution of electromyographic activity among flexor and extensor muscles was observed at the ankle The analysis of cinemagraphic data indicates a definite inclination of the body to lean forward at the beginning of flight, followed by a gradual return to a position identical to the one observed in a terrestrial gravity situation These results are interpreted utilizing biodynamic diagrams M G

N85-31814# Stirling Univ (Scotland) Dept of Psychology
MASS-DISCRIMINATION DURING PROLONGED WEIGHTLESSNESS
H E ROSS, E E BRODIE, and A BENSON (Royal Air Force Inst of Aviation Medicine) *In* AGARD Results of Space Expt in Physiol and Med and Informal Briefings by the F-16 Med Working Group 3 p Mar 1985 refs
Avail NTIS HC A08/MF A01

An experiment to compare weight and mass discrimination was conducted using 5 of the crew of STS-9 (Spacelab 1) as subjects Thresholds for mass discrimination under microgravity in flight were found to be higher by a factor of about 1 8 than for weight discrimination before the flight, and there was no consistent improvement throughout the 10 day mission This suggests that inertial cues to mass (gained through accelerating objects) are not as effective as weight cues The crew showed an aftereffect for two or three days on return to Earth, when their bodies felt heavy and their weight discrimination was impaired This suggests that some adaptation to weightlessness occurred during the flight, probably early in the mission before the majority of the mass discrimination tests were conducted G L C

N85-31815*# National Aeronautics and Space Administration Ames Research Center, Moffett Field, Calif
CHANGES IN CARDIOVASCULAR FUNCTION: WEIGHTLESSNESS AND GROUND-BASED STUDIES
H SANDLER, D J GOLDWATER, M W BUNGO (NASA, Lyndon B Johnson Space Center), and R L POPP (Stanford Univ) *In* AGARD Results of Space Expt in Physiol and Med and Informal Briefings by the F-16 Med Working Group 9 p Mar 1985 refs
Avail NTIS HC A08/MF A01 CSCL 06S

Echocardiographic measurements were taken on members of four Space Shuttle missions before (F-10 to F-12) and twice after (L+0 and L+7 to 14 days) 7- to 9-day space flight missions Such recordings allowed for determination of left ventricular chamber dimensions and subsequent calculations of left ventricular volume and stroke volume Resting ventricular volume could be shown to significantly decrease 23% on L+) and to be associated with a significant 28% decrease in stroke volume Studies 7 to 14 days layer showed amelioration of effects, but persistence of end diastolic volume change Such findings occurred despite ability to fully ambulate and exercise during the postflight period Comparison of findings with bed rested subjects (athletic and nonathletic) showed similar changes, but changes after bed rest were of smaller magnitude compared to the flight crews It is concluded that space flight induces significant changes in heart volume even after short duration (7-9 days) missions Heavy athletic conditioning preflight may contribute to the severity of the observed changes in the flight crews and to the apparent slow postflight process of recovery G L C

N85-31816# Tours Univ (France) Lab de Biophysique Medicale
STUDY OF THE CARDIOVASCULAR SYSTEM IN MICROGRAVITY: RESULTS AND PERSPECTIVES [ETUDE DU SYSTEME CARDIOVASCULAIRE EN MICROGRAVITE: RESULTATS ET PERSPECTIVES]
L POURCELOT, J M POTTIER, F PATAT, and P ARBEILLE *In* AGARD Results of Space Expt in Physiol and Med and Informal Briefings by the F-16 Med Working Group 9 p Mar 1985 refs In FRENCH Previously announced in IAA as A85-13112
Avail NTIS HC A08/MF A01

The cardiovascular system during weightlessness was studied during the Franco-Soviet Solyut 7 flight in June 1982 An ultrasonic system was developed which functions with Doppler effect, rapid imagery and time measurement The changes of volume and cardiac functions and the veneral circulation were studied before, during, and after the flight The dynamic cardiovascular system during flight was compared with simulation tests
Transl by E A K

N85-31817# Freie Univ , Berlin (West Germany) Dept of Physiology
CARDIOVASCULAR RESEARCH IN SPACE: PROBLEMS AND RESULTS
K A KIRSCH, L ROECKER, R KRAUSE, O H GAUER, H J WICKE, R. F LANDRY, and B BUENSCH *In* AGARD Results of Space Expt in Physiol and Med and Informal Briefings by the F-16 Med Working Group 10 p Mar 1985 refs Sponsored by Bundesministerium fuer Forschung und Technologie
Avail NTIS HC A08/MF A01

In order to see whether the headward fluid shift during spaceflight is followed by increased venous pressures in the upper half of the body in astronauts during the Spacelab 1 Mission pressures in an antecubital vein (PVP) was measured together with the hematocrit (Hct) and the ADH concentration pre-, in- and post-flight Central venous pressure was followed pre- and post-flight, together with the dy weight (BW) 22 hours after launch PVP was lowered as compared to pre-flight values and remained so during the whole mission, whereas Hct and the ADH were elevated Apparently the space adaptation of the low pressure system is a highly dynamic process being over within 24 hours The readaptation to ground conditions follows a similar time course Author

N85-31818# Rome Univ (Italy). Postgraduate School of Aerospace Medicine
THREE-DIMENSIONAL BALLISTOCARDIOGRAPHY IN MICROGRAVITY
A SCANO, E RISPOLI, F STROLLO (INRCA), and G CAMA (ISEF) *In* AGARD Results of Space Expt in Physiol and Med and Informal Briefings by the F-16 Med Working Group 13 p Mar 1985 refs
Avail NTIS HC A08/MF A01

Some triaxial ballistocardiograms (BCG) and one electrocardiogram lead have been repeatedly recorded on 4 crew-members of the Columbia Shuttle (STS-9) before, during and after a microgravity period of 9 days In view of this project a miniaturized accelerometric equipment was designed and manufactured so as to pick-up the BCG signal from the dorsal region and to record it on a magnetic 4-track tape recorder A special sequence was devised and implemented in the various flight and round states The measurements carried out on numerous and long tracing samples, previously decoded and transcribed on paper, proved the reliability of this technique B W

N85-31819# Antwerp Univ (Belgium)
SLEEP AND WAKE PHYSIOLOGY IN WEIGHTLESSNESS
O QUADENS, H L GREEN (Clinical Research Center, Harrow), and P DEQUAE *In* AGARD Results of Space Expt in Physiol and Med and Informal Briefings by the F-16 Med Working Group 6 p Mar 1985 refs
Avail NTIS HC A08/MF A01

Among the electrophysiological parameters which are used to define the sleep and waking states, the muscle activity (EMG) and the eye-movements (EOG) were recorded during sleep in the Spacelab 1 mission, allowing detection of Rem-sleep but precluding evaluation of slow wave sleep The EOG evidenced an important increase in the number of eye-movements during night zero as compared to the pre- and postflight baseline data The waking electroencephalogram (EEG) was recorded during parabolic flights and showed a significant increase in the theta frequency band during the acrophase of the parabolas Author

N85-31820# Eidgenoessische Technische Hochschule, Zurich (Switzerland) Lab fuer Biochemie
SENSITIVITY OF HUMAN LYMPHOCYTES TO MICROGRAVITY IN-VITRO
A COGOLI *In* AGARD Results of Space Expt in Physiol and Med and Informal Briefings by the F-16 Med Working Group 8 p Mar 1985 refs
Avail NTIS HC A08/MF A01

Studies were conducted on the effect of gravity on lymphocytes, the cells responsible for the immune response A decrease of lymphocyte reactivity has been observed since 1973 in Soviet and U S astronauts after space flight Ground-based studies performed in hypergravity and in simulated low-gravity conditions suggest the hypothesis that low-g depresses, whereas high-g increases lymphocyte activation Cultures of human lymphocytes were flown in an incubator on the 1st Spacelab mission and exposed to the mitogen concanavalin A, a substance capable of activating lymphocytes in-vitro The stimulation of the flight samples was less than 3 percent of that of the ground controls Although the results are very clear, it is premature now to draw conclusions from this experiment on the effect of space flight on the immune system of the astronauts B W

N85-31821# Deutsche Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany) Inst for Aerospace Medicine
BIOSTACK EXPERIMENTS ON STS-FLIGHTS AND THE IMPACT FOR MAN IN SPACE
H BUECKER *In* AGARD Results of Space Expt in Physiol and Med and Informal Briefings by the F-16 Med Working Group 8 p Mar 1985 refs
Avail NTIS HC A08/MF A01

The radiobiological properties of the heavy ions of cosmic radiation were investigated on Spacelab 1 by use of biostacks, monolayers of biological test organisms sandwiched between thin foils of different types of nuclear track detectors Biostacks were exposed to cosmic radiation at several locations with different shielding environments in the module and on the pallet Evaluations of the physical and biological components of the experiment to data indicate that in general they survived the spaceflight in good condition Dosimetric data are presented for the different shielding environments Author

N85-31822# Belgian Air Force, Brussels Centre Medical
SELECTION PROCEDURES FOR F-16 PILOTS IN THE BELGIAN AIR FORCE
P VANDENBOSCH *In* AGARD Results of Space Expt. in Physiology and Med and Informal Briefings by the F-16 Med Working Group 8 p Mar 1985 refs
Avail NTIS HC A08/MF A01

By the introduction of the high sustained G F-16 aircraft, the problem of the physical standards was raised These physical standards for flying must ensure that individuals selected for aviation duties are free from medical conditions or defects which could adversely affect flying safety, mission completion, or their own health The standards should ensure that an individual selected for flying training is qualified for world wide duty That means that he should not only be capable of enduring the various stresses involved in flying, but also be capable of withstanding the considerable stresses involved in ejection or egress from the aircraft, and in escape and survival in a hostile environment There exist a number of mild or subclinical medical conditions which could be aggravated by high sustained G or potentially result in sudden pilot incapacitation The pathology of these conditions influenced by high G effects are examined Author

N85-31823# United States Air Forces in Europe, APO New York 09012
G-INDUCED LOSS OF CONSCIOUSNESS (GLC)
R F LANDRY *In* AGARD Results of Space Expt in Physiol and Med and Informal Briefings by the F-16 Med Working Group 3 p Mar 1985
Avail NTIS HC A08/MF A01

Although not a new phenomenon, GLC has recently been implicated more frequently as the primary cause for aircraft mishaps New generation aircraft with the ability of rapid onset and sustainability of high accelerative forces is certainly the major reason for this Pilot surveys have revealed GLC is more common than previously thought Prevention of GLC is totally dependent on education of the aircrews education on the timely performance of a proper anti-G straining maneuver, the physiology of GLC, and the need to maintain the body in optimal condition for flying Author

N85-31824# Danish Defence Command, Vedbaek Aeromedical Services
PHYSICAL TRAINING AND G TOLERANCE
K JESSEN *In* AGARD Results of Space Expt in Physiol and Med and Informal Briefings by the F-16 Med Working Group 8 p Mar 1985 refs
Avail NTIS HC A08/MF A01

High performance aircraft impose extreme physiological stress to the pilots In particular is the G tolerance of the pilots crucial as exposure to sustained and repeated acceleration forces acting in the head-to-foot direction induces increased demands on cardiovascular and pulmonary functions The use of backward tilting of the seat and of anti-G-suits will in combination with straining maneuvers help tolerance of high G forces The effect of the straining on G tolerance will depend on the capacity of the cardiovascular system and of the oxidative metabolic capacity of the exercising muscles (in particular abdominal and leg muscles) Physical training could consequently be one possibel way to improve G tolerance The effects of training on the body and how it can be achieved are considered Author

N85-31825# Royal Netherlands Air Force, Soesterberg Aviation Medicine Div
CENTRIFUGE OPERATIONS AND TRAINING IN THE ROYAL NETHERLANDS AIR FORCE
H VANDENBIGGELAAR and G HOEKSTRA *In* AGARD Results of Space Expt in Physiol and Med and Informal Briefings by the F-16 Med Working Group 4 p Mar 1985
Avail NTIS HC A08/MF A01

With the introduction of a new generation fighter aircraft many nations are confronted with the High Sustained G (HSG) phenomenon This phenomenon may result in a sudden unexpected loss of consciousness (GLC) which has proven to cause fatalities Three requirements must be met by the pilot of a HSG fighter in order to be able to master his man machine system, without losing his consciousness (1) good understanding of the anti-G straining techniques, (2) excellent physical condition, and (3) well fitting anti-G suit The Royal Netherlands Airforce uses a Human Centrifuge as training aid for the G-training of the F-16 pilot population How this centrifuge affects pilot training is considered Author

N85-31826# United States Air Forces in Europe, APO New York 09012
HYDRAZINE AND THE F-16
R F. LANDRY *In* AGARD Results of Space Expt in Physiol and Med and Informal Briefings by the F-16 Med Working Group 2 p Mar 1985
Avail NTIS HC A08/MF A01

The introduction of the F-16 into many of the world's air forces has also introduced a rocket fuel to many areas previously unfamiliar with the propellant In the event of the single engine failure or any interruption of hydraulic or electrical power, a high energy, quick response (three seconds) source of emergency power is available in the Emergency Power Unit (E P U) which is fueled by hydrazine The hydrazine is in the form of H70 (70% N2H4 and 30% H2O) and 6.8 US gallons make a full tank The toxicity of hydrazine is considered along with ways to safely handle it Author

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BEHAVIORAL SCIENCES

Includes psychological factors, individual and group behavior, crew training and evaluation, and psychiatric research

A85-40552#
APPLICATION OF THE DYNAMIC FLIGHT SIMULATOR (DFS) TO EVALUATE PILOT PERFORMANCE IN A SIMULATED F-14 FLAT SPIN ENVIRONMENT
J EYTH, JR and D P GLEISNER (U S Navy, Naval Air Development Center, Warminster, PA) IN Flight Simulation Technologies Conference, St Louis, MO, July 22-24, 1985, Technical Papers New York, AIAA, 1985, p 1-5 refs
(AIAA PAPER 85-1730)

An investigation is conducted into the aircrew safety problem associated with the steady state flat spin mode of the F-14A aircraft, using the U S Navy Dynamic Flight Simulator (DFS), which employs a 50-foot radius human centrifuge as a motion base DFS is the only ground-based flight simulator capable of reproducing the multidirectional, sustained-G environment of actual flight Based on the distance of the pilot from the perpendicular spin axis of the aircraft (23 feet), the pilot can be subjected to 'eyeballs-out' G-forces of as much as 6 5 Gs, resulting in nearly total incapacitation The present flat spin simulations have uncovered several unsuspected aspects of the pilot's response capabilities in this state O C

A85-42059
EFFECTS OF SOME MOTION SICKNESS SUPPRESSANTS ON STATIC AND DYNAMIC TRACKING PERFORMANCE
D J SCHROEDER, W E COLLINS (FAA, Civil Aeromedical Institute, Oklahoma City, OK), and G W ELAM (Medical Building, Odessa, TX) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, April 1985, p 344-350 refs

Two studies examined the influence of three established antimotion sickness drugs on tracking performance in static (stationary) and dynamic (angular acceleration) conditions and on visual fixation ability during motion In Study I, 40 young men were randomly assigned in equal numbers to either a control (lactose placebo), dimenhydrinate (50 mg), promethazine hydrochloride (25 mg), or mixture (25 mg promethazine plus 10 mg d-amphetamine) group Study II used 30 new subjects equally divided into control, dimenhydrinate (100 mg), and promethazine (50 mg) groups Following practice, tests were conducted prior to, and 1, 2, and 4 h after drug ingestion The depressant drugs had little effect on static tracking, but impaired dynamic tracking performance and reduced ability to maintain visual fixation on a localizer/glide slope instrument due to increased ocular nystagmus The mixture of promethazine plus d-amphetamine produced none of these deleterious effects Author

A85-43112
PSYCHOSOCIAL FACTORS AFFECTING SIMULATED AND ACTUAL SPACE MISSIONS
N KANAS (U S Veterans Administration Medical Center, San Francisco, CA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, Aug 1985, p 806-811 refs

As space missions become longer and broader in scope, and as crews become more heterogeneous, psychological and interpersonal factors will take on increasing importance In order to isolate instructive psychosocial issues and trends, a review was made of over 60 American and Russian simulation and spaceflight studies and reports Although the missions accomplished most of their goals, psychological and social stresses were evident in the crew members Psychosocial problems tended to relate to mission length There was evidence that the use of appropriate psychological testing and interpersonal sensitivity training could improve crew selection and ameliorate problems in the simulation

studies It is time to apply this knowledge to actual spaceflight conditions Author

N85-30626# Royal Aircraft Establishment, Farnborough (England)
THE VALUE OF DMT IN THE SELECTION OF PILOTS
L SJOEBERG Aug 1984 9 p refs Transl into ENGLISH from Nord Psykologi (Norway), v 33, no 4, 1981 p 241-248
(RAE-TRANS-2127, BR95821) Avail NTIS HC A02/MF A01

Critical comments concerning a doctoral thesis in psychology entitled The Dimensioning and Validation of Defence Mechanisms in Percept Genesis are presented (Neuman 1978) An attempt was made to design and evaluate a method of personality diagnosis, by means of which it should be possible inter alia to predict success or failure as a pilot in the Swedish Air Force The test method was based on a total of 760 trainee pilots aged from 17 to 23 years The method was subsequently tested on two new groups of trainee pilots, one of them from the Danish Air Force Neuman's results are to some extent quite striking he reports a notable success in predicting failures in basic pilot training, and also the subsequent failures, e g , in the form of accidents Since the test - termed DMT (Defence Mechanism Test) - started being used in Air Force selection in 1970, the results of training have also improved quite drastically However there is some doubt as to how far the test has contributed to this improvement, partly because other changes were introduced simultaneously with the test An evaluation is made as to the validity the DMT in the selection of pilots The test is also assessed in terms of its ability to quantify the salient features in personality B W

N85-30627# Air Force Human Resources Lab , Brooks AFB, Tex
PSYCHOLOGICAL ISSUES RELEVANT TO ASTRONAUT SELECTION FOR LONG-DURATION SPACE FLIGHT: A REVIEW OF THE LITERATURE Final Technical Paper, Jan. 1982 - Dec. 1983
D L COLLINS Apr 1985 63 p
(AD-A154051, AD-E700017, AFHRL-TP-84-41) Avail NTIS HC A04/MF A01 CSCL 05J

Since the inception of the manned spaced program, there has been an emphasis on selecting only those astronauts who would be the most psychologically resistant to problems which could result from the exotic, stressful, and unforgiving environment of space This paper addresses space-related behavioral problems experienced by the United States and the Soviet Union Specifically addressed are contentious episodes and impaired judgements that occurred during the Mercury, Apollo, and Skylab missions Interpersonal dissension has repeatedly occurred among the astronauts and with the authorities on the ground at Houston control The careful selection procedures which have been used in the past have failed to predict that astronauts would be so adversely affected by the stresses of space flight Soviet cosmonauts also experienced repetitive episodes of interpersonal tension and poor judgement during their recording-breaking Salyut space missions The behavioral problems which occur during space flight often do not terminate when the space flight ends, but linger with notable after affects The post-flight problems of ex-astronauts and the implications of isolation and confinement for future long-duration space flights are discussed Other variables (e g , compatibility, cohesiveness, crew size, and crew performance) which affect group interaction, and the need for psychological compatibility of space crewmembers, are addressed using both American and Soviet literature Also addressed are evolutionary changes in the space mission and the psychological tests that have been used for astronaut selection GRA

N85-30628# Applied Science Associates, Inc , Valencia, Pa
MAINTENANCE TRAINING SIMULATORS PRIME ITEM DEVELOPMENT SPECIFICATION. MODEL SPECIFICATION AND HANDBOOK Final Technical Report, Sep. 1983 - Sep. 1984
R J HRITZ, G R PURIFOY, JR , and J A FITZPATRICK Brooks AFB, Tex Air Force Human Resources Lab Apr 1985 456 p
(Contract F33615-78-C-0019)
(AD-A154108, AFHRL-TP-84-44) Avail NTIS HC A20/MF A01 CSCL 05I

This document contains a model specification for maintenance training equipment An accompanying handbook gives instructions on tailoring the specification for a particular application The specification allows both training and engineering functional requirements to be stated and is designed to facilitate the inclusion of information related to instructional systems development The specification provides a standard format while avoiding over-specification of requirements or restriction of contractor engineering decisions The handbook assists the specification preparer in determining appropriate requirements and gives reasons for these requirements The value appropriate for particular parameters, source documents, and lessons learned in previous acquisition GRA

N85-30629# Illinois Univ , Urbana Model Based Measurement Lab
PERFORMANCE ENVELOPES AND OPTIMAL APPROPRIATENESS MEASUREMENT
M V LEVINE and F DRASGOW Dec 1984 48 p
(Contract N00014-79-C-0752)
(AD-A154129, MEASUREMENT-SER-84-5) Avail NTIS HC A03/MF A01 CSCL 05J

The test-taking behavior of some examinees may be so idiosyncratic that their test scores are not comparable to the scores of more typical examinees, Appropriateness indices provide quantitative measures of response-pattern atypicality, An appropriateness index can be viewed as a test statistic for testing a null hypothesis of normal test-taking behavior against an alternative hypothesis of atypical test-taking behavior In this paper performance curves and the performance envelope are introduced as devices for obtaining a least upper bound for the power of the most powerful statistical tests for aberrance The performance envelope of a set of tests is the function on (0,1) whose value at t is the least upper bound of the hit rates of the tests when their false positive rate is t The performance curve of an appropriateness is the performance envelope of the tests for aberrance based on the index For some types of testing anomalies it is possible to determine the performance envelope for the set of all statistical tests for aberrance and to identify a test whose performance curve is identical to this performance envelope An algorithm for computing some of these optimal tests is described, and an example of its use is presented GRA

N85-30630# Planning Systems International, Inc , Falls Church, Va
A SYSTEMATIC DETERMINATION OF SKILL AND SIMULATOR REQUIREMENTS FOR AIRLINE TRANSPORT PILOT CERTIFICATION Final Report, Apr. - Nov. 1984
D C GILLIOM, W D SPEARS, H J DEMUTH, P P EDDY, and D E HANLEY Mar 1985 247 p
(Contract DTRS57-84-C-00074)
(AD-A154135, FAA/VS-84-1) Avail NTIS HC A11/MF A01 CSCL 05I

This research report describes (1) the FAA's ATP airman certification system, (2) needs of the system regarding simulator use, (3) a systematic methodology for meeting these needs, (4) application of the methodology, (5) results of the study, and (6) conclusions The methodology developed is airman Certification Systems Development, or ACSD Application of ACSD entailed a systematic study of the airman certification process The study produced behaviorally define evaluation and training objectives, sensory cue and behavioral analyses to support these objectives,

and a statement of media requirements based on the objectives and behavioral and cueing data This report provides comprehensive documentation of the results of the ACSD methodology as a tool to analyze simulator use in FAA airline transport pilot certification GRA

N85-31827# Royal Aircraft Establishment, Farnborough (England)
THE VALUE OF DMT IN THE SELECTION OF PILOTS
L SJOEBERG Aug 1984 9 p refs Transl into ENGLISH from Nord Psykologi, v 33, no 4, 1981 p 241-248
(BLL-RAE-LIB-TRANS-2127-(5207)) Avail NTIS HC A02/MF A01

Proceeding from a critical consideration of a recently published treatise on defence mechanism test (DMT) and its ability to predict failures in pilot training and subsequent flying accidents, the question is Has this test succeeded in doing what so many psychologists have been vainly trying to achieve for 50 years, i e, to quantify the salient features in personality? DMT testing was found to affort some interesting empirical relationships Neuman's search for objective methods of evaluation, of the potentially practical value of his results and his investigation of the validity of the parallelistic postulate is reviewed Author

N85-31828# Office National d'Etudes et de Recherches Aerospatiales, Paris (France) Direction des Etudes de Synthese
LEARNING AND SELF ADAPTATION APPLIED TO THE SIMULATION OF A HUMAN PILOT [APPRENTISSAGE ET AUTO-ADAPTATION APPLIQUES A LA SIMULATION DU PILOTE HUMAIN]
D SOULATGES 30 Nov 1984 71 p refs In FRENCH
(Contract DRET-81-34-730)
(ONERA-RT-24/5122-SY) Avail NTIS HC A04/MF A01

A computerized simulation of the behavior of human pilots was modified to include learning and adaptation Algorithms describing the way in which the parameters of the pilot's operative image are modified with learning are discussed The progression of a pilot's training is simulated as well as the behavior of a trained pilot on a new type of aircraft Author (ESA)

N85-31829# Imperial Coll of Science and Technology, London (England) Computational Fluid Dynamics Unit
ENGINEERING EDUCATION BASED ON COMPUTER SIMULATION
D B SPALDING Mar 1985 15 p
(CFD/85/1) Avail NTIS HC A02/MF A01

It is proposed that the applied-science component of engineering education can be most effectively conducted by extensive use of computer-simulation techniques The analytical-model component would be cut back to give greater prominence to fundamental laws and their simpler manifestations, and to allow students to explore the more complex consequences of these laws by means of specially-designed computer simulators Laboratory experiments would remain important but they would be employed mainly as tests of the realism of the simulations Author (ESA)

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MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering, biotechnology, and space suits and protective clothing

A85-40242
DIGITAL SIMULATION OF THE MAN-MACHINE SYSTEM 'AIRCRAFT' [ZUR DIGITALEN SIMULATION DES MENSCH-MASCHINE-SYSTEMS 'FLUGZEUG']
B DOERING (Forschungsinstitut fuer Anthropotechnik, Wachtberg-Werthhoven, West Germany) Ortung und Navigation (ISSN 0474-7550), vol 26, no 1, 1985, p 51-73 In German refs

The modeling, implementation, simulation, and analysis involved in the digital simulation of the aircraft man-machine system are examined A procedure for system analysis is given along with a few mathematical models of the aircraft dynamics and the pilot behavior The implementation converts this conceptual model into an internal computerized model Examples of simulation languages used in these procedures are given Temporal state trajectories are obtained which describe the behavior of the aircraft system Each state is characterized by corresponding flight-dynamic and pilot-specific values Some analytical examples are given C D

A85-40345#
APPLICATION OF MANIPULATOR SYSTEMS IN SPACE FLIGHT [ANWENDUNG VON MANIPULATORSYSTEMEN IN DER RAUMFAHRT]
G HIRZINGER (DFVLR, Institut fuer Dynamik der Flugsysteme, Wessling, West Germany) Deutsche Gesellschaft fuer Luft- und Raumfahrt, Jahrestagung, Hamburg, West Germany, Oct 1-3, 1984 25 p In German refs
(DGLR PAPER 84-134)

The development of telemanipulators and robots for use in space missions is discussed, from the perspective of the West German space industry The need for manipulators with greater capacity for autonomous control via built-in sensors as the distance between the human controller and the manipulator increases (as in GEO or deep-space missions controlled from earth) is stressed, and the application of artificial intelligence methods and other technologies currently available or under development for industrial robots is urged Consideration is given to sensor technology (TV or CCD cameras, distance sensors, or moment-of-force and tactile sensors), problems associated with microgravity, potential robot applications (rendezvous and docking, assembly and repair, planetary-surface rovers, observation, and problem solving), and the aims of current research at CNES and DFVLR Drawings, diagrams, and photographs are provided T K

A85-40559#
USING HUMAN MOTION PERCEPTION MODELS TO OPTIMIZE FLIGHT SIMULATOR MOTION ALGORITHMS
K S FORSSTROM, J DOTY (Northrop Corp, Advanced Systems Div, Pico Rivera, CA), and F M CARDULLO (New York, State University, Binghampton) IN Flight Simulation Technologies Conference, St Louis, MO, July 22-24, 1985, Technical Papers New York, AIAA, 1985, p 46-51 refs
(AIAA PAPER 85-1743)

A simulator motion analysis tool has been developed which employs human motion perception models to objectively judge the quality of simulator platform motion This 'motion analytical tool' is an interactive program that interfaces with the user by means of questions or messages that are printed on a computer CRT terminal The user may select either a motion input driver or simplified commercial transport aircraft mathematical model to provide aircraft parameter input values With human perception models thus validated, a motion experimenter can isolate those

motion parameters that mot prominently contribute to the pilot's perceived motion O C

A85-41071
CAN HELICOPTERS BE CONTROLLED BY VOICE?
Aerospace Engineering (ISSN 0736-2536), vol 5, July 1985, p 42-47

The possible use of computer speech-generation and speech-recognition systems for display/warning and control functions in the cockpits of military helicopters for high-pilot-workload missions such as nap-of-the-earth flying is discussed, summarizing the results of recent R&D efforts Consideration is given to the information-processing demands of advanced aircraft and weapon systems, the role of multifunction displays in streamlining the visual input to the pilot, the principles of voice-interactive system design (speech recognizers, speech generators, and syntax processors), the identification of cockpit tasks suitable for voice control, and the optimization of voice warning systems It is argued that while voice systems are feasible in many applications, their use should be limited (in keeping with the overall strategy of streamlining and simplifying cockpit instrumentation) to the areas of greatest need. T K

A85-41694
MEASUREMENT OF THE SPECTRUM OF LINEAR ENERGY LOSSES OF COSMIC RAYS BY THE COSMOS-1129 SATELLITE [IZMERENIE SPEKTRA LINEINYKH POTER' ENERGII KOSMICHESKOGO IZLUCHENIIA NA ISZ 'KOSMOS-1129']
A B AKOPOVA, A I VIKHROV, V. E DUDKIN, N. V MAGRADZE, A A MOISEENKO et al Kosmicheskie Issledovaniia (ISSN 0023-4206), vol 23, May-June 1985, p 479-481 In Russian

An integrated spectrum of linear cosmic-ray energy losses was obtained on the basis of Cosmos-1129 measurements, and a comparison was made with Cosmos-782 and Cosmos-936 results It is shown that the measurement of the time-integrated characteristics of cosmic rays can be simplified by replacing the conventional system of track and electronic detectors by a single detector a nuclear emulsion with a controlled registration threshold, operating reliably in the dE/dx range from approximately 10 to 10,000 MeV/cm B J

A85-42082
SUBJECTIVE EFFECTS OF COMBINED-AXIS VIBRATION. II - COMPARISON OF X-AXIS AND X-PLUS-PITCH VIBRATIONS
R W SCHOENBERGER (USAF, Aerospace Medical Research Laboratories, Wright-Patterson AFB, OH) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, June 1985, p 559-563 refs
(Contract F33615-79-C-0509)

Seated subjects matched their perceptions of the intensity of single-axis vibrations in the X-axis, or combined-axis vibrations made up of X-axis and pitch motions, by adjusting the intensity of a sinsoidal, 5 Hz, Z-axis response vibration Stimulus vibrations were sinusoidal at 3 15, 4, 5, 6 3 and 8 Hz For each frequency, both types of vibration were presented at three acceleration levels related to three axis-to-seat distances for the pitch vibrations Results showed that Z-axis response accelerations were essentially constant across frequency However, matching responses were significantly higher for X-plus-pitch than for X-axis vibrations. These findings are in contrast to those of a previous experiment involving Y-axis and roll vibrations, and are probably due to additional input from the seat back for X and pitch motions The two experiments do agree on the importance of the distance of the subject from the axis of rotation for angular motions In both experiments, as stimulus acceleration (axis-to-seat distance) increased, response acceleration increased substantially at every frequency Author

A85-42090
PORTABLE AIR MOBILE LIFE SUPPORT UNIT
Y. NOY-MAN, M Z PAPA, and S Z MARGALIOT (Israel Air Force, Aeromedical Centre, Tel-Hashomer, Israel) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, June 1985, p 598-600

The portable Air Mobile Life Support (AMLS) system developed for use in air-rescue operations by the Israeli Air Force is characterized The AMLS package comprises an oxygen ventilation system, a cardiac-monitoring and defibrillation system, and a vacuum pump for aspiration of secretions and can be moved easily as a whole or in part from one aircraft to another The types of cases handled and treatment given during 78 peacetime rescue missions and 38 wartime sorties are listed in tables T K

A85-42242
TRANSITION TO METRIC UNITS IN MEDICAL RADIOLOGY [PEREKHOD K EDINITSAM SI V MEDITSINSKOI RADIOLOGII]
M SH VAINBERG Moscow, Izdatel'stvo Meditsina, 1984, 128 p In Russian refs

The transition to the measurement of radiation quantities in metric units in medical radiology is examined with attention given to tables and nomograms of radiation units, and to techniques and equipment for the determination of these units Explanatory and methodological material on the transition to metric units in radiology on the basis of the GOST 8 417-81 standard is presented B J

A85-42873
AN EXPOSURE SYSTEM FOR VARIABLE ELECTROMAGNETIC-FIELD ORIENTATION ELECTROPHYSIOLOGICAL STUDIES
J D FORSTER (Fonar Corp , Melville, NY), F S BARNES, H WACHTEL (Colorado, University, Boulder), R R BOWMAN (Vitek, Boulder, CO), J W FRAZER (Anderson Hospital, Houston, TX) et al IEEE Transactions on Microwave Theory and Techniques (ISSN 0018-9480), vol MTT-33, Aug 1985, p 674-680 refs
(Contract N00014-81-K-0387)

A TEM system for exposing isolated nerve cells at 2 GHz is described The system allows for monitoring of transmembrane potentials by means of microelectrodes and variation of the angle between the electric-field vector and the cell An S-parameter characterization of the system is included along with temperature profile measurements for the energy distribution within the exposure chamber Additional data on the transient electrical characteristics of microelectrodes upon exposure to microwave pulses in this system are included along with a few examples of the response of Aplysia pacemaker neurons to microwave fields Author

A85-43098
EXPOSURE OF HUMAN MODELS IN THE NEAR AND FAR FIELD - A COMPARISON
M A STUCHLY (Department of Health and Welfare, Radiation Protection Bureau, Ottawa, Canada), A KRASZEWSKI, and S S STUCHLY (Ottawa, University, Canada) IEEE Transactions on Biomedical Engineering (ISSN 0018-9294), vol BME-32, Aug 1985, p 609-616 Research supported by the U S Navy, Department of Health and Welfare, Canada and NSERC refs

The specific absorption rate (SAR) was measured in over 650 locations in a full-scale model of man exposed in the far and near field of antennas at 350 and 915 MHz The whole-body average, the body-parts average, and the distributions of the SAR's are compared for three wave polarizations for the far and the near-field exposures Effects on the energy deposition of the antenna type, gain, and location in the near field are discussed Author

A85-43108
BLINK REFLEX AS A PARAMETER OF HUMAN OPERATOR'S FUNCTIONAL STATE
P V SIMONOV and M V FROLOV (AN SSSR, Institut Vysshei Nervnoi Deiatel'nosti i Neirofiziologii, Moscow, USSR) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, Aug 1985, p 783-785

Eyelid movements (EM)-blinking frequency and duration of closed eyes-may serve as a parameter of fatigue in humans performing as operators Twenty subjects were told to locate and follow visual signals appearing on a screen at the frequency of 4-5/h and moving in a background of bright noises EM was recorded in infrared rays with tiny sensors attached to glasses' rim EEG and ECG were recorded simultaneously It was found that a change in EM is a sensitive parameter of fatigue and better corresponds to decreased quality of performance (time of locating signal and error in following), than changes in R-R interval In the second experimental series, symptoms of fatigue discovered by EM were accompanied by sound signals, which improved operator's performance by 15-20 percent Recording of EM may be used to monitor operator's state in humans and to forecast reliability of performance Author

A85-43111
MODIFICATION OF OTIS-MCKERROW VALVE FOR MEASUREMENT OF RESPIRATORY WATER LOSS
W L HOLDEN, L A STROSCHEIN, M A KOLKA, L A STEPHENSON, and R R GONZALEZ (U S Army Research Institute of Environmental Medicine, Natick, MA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, Aug 1985, p 803-805 refs

An apparatus is described that allows a continuous measurement of inspired and expired gas dew-point temperature for the calculation of water loss (Eres) during ventilation A rapid response dew-point temperature measurement method is described which is based ona small Peltier module The compact structure with near zero system dead space minimizes potential errors inherent in many techniques used to measure Eres The simple design and rugged construction permit the incorporation of the apparatus into many manual or personal computer controlled oxygen consuption systems Collection of data may be done in a variety of ambient temperatures, altitudes, and activity levels There is also the potential for creating a portable system for field use Author

A85-43113
OPERATION G-INDUCED LOSS OF CONSCIOUSNESS - SOMETHING OLD; SOMETHING NEW
R R BURTON and J E WHINNERY (USAF, School of Aerospace Medicine, Brooks AFB, TX) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol 56, Aug 1985, p 812-817 refs

Technical and psychophysiological causes of G-induced loss of consciousness (LOC) in aircrews flying high-performance aircraft, and the various means for alleviating LOC are discussed Poorly executed anti-G straining maneuver is considered to be the primary cause of the G-induced LOC Improvements made in the present anti-G equipment (anti-G suit/valve systems) and in anti-G methods designed to increase the pilot's tolerance and technique (adequate centrifuge training, frequent G exposures, various conditioning programs) serve only to reduce but not to eliminate LOC Supination of the aircrew to a minimum seat back angle of 60 to 65 degrees, in order to reduce the arterial column length relative to the G vector, is suggested as a means directed towards elimination of LOC I S

A85-43277* National Aeronautics and Space Administration Langley Research Center, Hampton, Va
PROTON DOSIMETER DESIGN FOR DISTRIBUTED BODY ORGANS
J W WILSON (NASA, Langley Research Center, Hampton, VA) and G S KHANDELWAL (Old Dominion University, Norfolk, VA) Nuclear Technology (ISSN 0029-5450), vol 69, June 1985, p 393, 394
(Contract NCC1-42)

A simple dosimeter design has been developed by NASA to monitor the space proton dose (in rads) to a distributed body organ as a linear combination of ion chambers with varying wall thickness Estimated doses are given for ion chambers of thickness 2, 3, 4, and 5 g/sq cm The analytical equation used to calculate the dose distribution factor is also given I H

N85-30586# Joint Publications Research Service, Arlington, Va
DIET OF FIRST SOVIET EXPEDITION ON MOUNT EVEREST
M S BELAKOVSKIY, V A VOSKOBOYNIKOV, V N GUYLYAYEV, T S ZAKHARENKO, Y A SENKEVICH, V A IVANOV, and N G BOGDANOV *In its* USSR Rept Space Biol. and Aerospace Med., Vol 18, No 5, Sep.-Oct 1984 p 14-19 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep.-Oct 1984 p 10-14
Avail NTIS HC A08

Biomedical requirements for the diets to be used by the Soviet mountaineers during their Everest expedition were determined, employing the experience of Soviet mountaineers who have ascended the highest summits in the U S S R, have conquered the Himalaya Mountains and the Karakoram Range, as well as current concepts of human physiology and biochemistry in highlands The major nutritional parameters of the diets and the arrangement of meals are given The Soviet mountaineers were on the whole happy with the diets and showed no disorders in the gastrointestinal system or digestive function that could be of nutritional origin R J F

N85-30587# Joint Publications Research Service, Arlington, Va
PSYCHOPHYSIOLOGICAL NATURE OF AIRCRAFT FEEL
A V VORONA, S V ALESHIN, and A M. SAFRONOV *In its* USSR Rept Space Biol and Aerospace Med, Vol 18, No 5, Sep.-Oct 1984 p 20-25 20 Nov 1984 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 18, no 5, Sep.-Oct 1984 p 14-18
Avail NTIS HC A08

On the basis of reported data and questionnaires filled in by 26 pilots and 60 cadets an attempt was made to give a psychophysiological characterization to aircraft perception It was compared with the characteristics of motor skills and thus the aircraft perception was interpreted as an objective property of flying skills, i e, a specific expression of automatic actions the pilot performs when flying a plane At a certain stage of the development of the flying skills, some movements are controlled via direct sensations and perceptions of noninstrumented signals The aircraft sensation unloads the pilot's attention allowing him to concentrate on other problems Author

N85-30631# National Academy of Sciences - National Research Council, Washington, D C Committee on Human Factors
HUMAN ENGINEERING GUIDE TO EQUIPMENT DESIGN (HEGED) Letter Report
Mar 1985 8 p Revised
(Contract N00014-85-G-0093)
(AD-A154087) Avail NTIS HC A02/MF A01 CSCL 05E

At the request of the Technical Advisory Group (TAG) on Human Factors Engineering, sponsored by the Joint Army-Navy-Air Force Steering Group, the Committee on Human Factors in the National Academy of Sciences/National Research Council prepared recommendations on content revision and alternate delivery systems for the Human Engineering Guide to Equipment Design (HEGED) GRA

N85-30632# Air Force Human Resources Lab , Brooks AFB, Tex

AIR FORCE HUMAN RESOURCES LABORATORY RESEARCH AND DEVELOPMENT SUMMARY Quarterly Report, Jan. - Mar. 1985

E M BARLOW Apr 1985 10 p

(AD-A154310) Avail NTIS HC A02/MF A01 CSCL 05K

This report provides abstracts of research on. Psychological issues relevant to astronaut selection for long-duration space flight A review of the literature, General applications of heirarchical group using the HIER-GRP computer programming, Estimating ability with the wrong model, Computer-assisted instruction Decision Handbook, The 1980 youth population A verification report, Air Force Learning Research Laboratory Proposed research issues, Maintenance training simulators Logistical support cost considerations in design and acquisition; Manual and computer-aided sequential diagnostic inference, Trends shaping advanced aircrew training capabilities through the 1990s, Learning abilities measurement program Dimensions of information processing speed, Radar warning receiver special function trainer Preliminary evaluation, and Equipercentile test equating The effects of presmoothing and postsmoothing on the magnitude of sample-dependent errors GRA

N85-30633# Defence Research Establishment, Ottawa (Ontario)

THE LOCATION OF STRESS IN CLOTHING

R M CROW and M M DEWAR Dec 1984 38 p In ENGLISH, FRENCH summary

(AD-A154423, DREO-911) Avail NTIS HC A03/MF A01 CSCL 15E

This paper reports the results of a study to determine where stresses occur in clothing, and thus seams, and what stances cause the maximum stresses in typical Canadian Forces clothing It was found that crossing the arms in front with the hands on the opposite shoulders creates the greatest stress in the shirt or coveralls back This stance imposes stress in the lower part of the back armhole seam Raising the arms over the head creates a stress point at the back armscye Squatting is the stance which causes the greatest stress in the trousers and coveralls, this occurring along the upper, inner leg and crotch area/seams GRA

N85-30634# Department of the Air Force, Washington, D C

LIGHT-WEIGHT OXYGEN DELIVERY HOOD ASSEMBLY FOR HYPERBARIC CHAMBER Patent Application

J N ERLICH, inventor (to Air Force) 19 Mar 1985 14 p

(AD-D011709, US-PATENT-APPL-SN-713666) Avail NTIS HC A02/MF A01 CSCL 06K

The present invention provides a light-weight hyperbaric oxygen therapy hood assembly comprising a hood having a gas inlet and outlet The neckdam diaphragm can be varied from an open to a closed condition for sealing of the neckdam around the neck of the patient, the diaphragm being concentric to the hood and neckdam An inflatable bladder is providable at the back of the hood A check valve is affixable to the gas outlet of the hood This is a patent application GRA

N85-30635# Oak Ridge National Lab , Tenn.

LIQUID METAL REACTOR PROGRAMS: SAFEGUARDS AND PROGRAM ASSURANCE Technical Progress Report, Mar. 1985

W L COOPER, JR 19 Apr 1985 6 p

(Contract DE-AC05-84OR-21400)

(DE85-010621, ORNL/LMR/SP-85/3) Avail NTIS HC A02/MF A01

Information is presented concerning activities related to the nuclear standards programs and the application of standards in DOE-funded nuclear energy programs A nuclear standards program is outlined, along with significant progress and accomplishments DOE

N85-30636# Argonne National Lab , Ill Center for Human Radiobiology

COLLECTED EPIDEMIOLOGICAL STUDIES OF THE LATE EFFECTS OF INTERNAL RADIUM IN MAN, AND MECHANISTIC INVESTIGATIONS OF THOSE EFFECTS, PART 2 Annual Report, Jul. 1983 - Jun. 1984

Apr 1985 200 p refs

(Contract W-31-109-ENG-38)

(DE85-011174, ANL-84-103-PT-2, AR-15) Avail NTIS HC A09/MF A01

Epidemiological studies of the late effects of internal radium in man, and mechanistic investigations of those effects are discussed. An experimental technique for preparing thin sections of bone and the application of that technique in studying the comparative distribution of radium and plutonium are described Radiological dental changes due to radium in man and dog are compared In the study of the late effects of thorium in man, the relative activities of the daughter products in the lung were determined spectrometrically in vivo The exhalation of thoron in these persons was investigated in relation to lung burden of thorium and to personal factors such as smoking, age, and weight The administration of two isotopes to large mammals was used to demonstrate that the metabolism of plutonium is independent of route of entry and to determine the gastrointestinal absorption of plutonium Data on the exposure of 88 persons to radium were added to the data base, bringing the total of 2400 radium cases under study by the Center for Human Radiobiology DOE

N85-30637# Georgia Inst of Tech , Atlanta School of Mechanical Engineering

RESEARCH ON THE EXPERIMENTAL VERIFICATION OF DOSIMETRY CALCULATIONS Progress Report

J W POSTON Jun 1984 69 p refs

(Contract DE-AS05-79EV-10248)

(DE85-011282, DOE/EV-10248/T3) Avail NTIS HC A04/MF A01

Research focused on the development of a technique to section organ dosimeters and the application of the technique to dosimetry of the extremities In addition, a realistic model for the head and neck region was designed and a model for the circulating blood was proposed DOE

N85-30638# Health and Safety Executive, Sheffield (England)

PHYSICAL DIMENSIONS OF HUMANS; VALUES; THE EFFECT OF CLOTHING, WORKING CLOTHES AND PROTECTIVE EQUIPMENT ON THE DESIGN OF WORK PLACES

May 1985 5 p Transl into ENGLISH from Deut Inst fuer Normung (West Germany), v 33, no 402, pt 2, suppl 5, May 1979 5 p

(HSE-TRANS-10868, DIN-33-402-PT-2-SUPPL-5, FNERG-AA10-23-79) Avail NTIS HC A02/MF A01

The factors involved in the determination of the dimensions of workspaces are discussed Physical dimensions and envelope curves relating to the unclothed human subject cannot be relied on entirely Positive allowances should be made for normal and working clothes or personal protective equipment Negative allowances should be made for any limitation of mobility Major human factors considerations that should be taken into account are discussed B W

N85-30639# Health and Safety Executive, Sheffield (England) Translation Services
THE DESIGN OF WORKING SYSTEMS ON ERGONOMIC PRINCIPLES. THE IMPORTANCE OF CLOTHES AND PROTECTIVE EQUIPMENT IN THE DESIGN OF THE WORKPLACE
May 1985 7 p Transl into ENGLISH from Deut Inst fuer Normung (West Germany), v 33, no 400, suppl 7, Aug 1977 7 p
(HSE-TRANS-10865, DIN-33-400-SUPPL-7, FNERG-AA-10-30A-77, FNERG-AA-2-14A-77) Avail NTIS HC A02/MF A01

Those criteria which determine the effects of clothing and protective equipment on body dimensions, the changes in center of gravity due to protective gear, the effects of this equipment on performance and on the risk of accident are discussed G L C

N85-30640# Health and Safety Executive, Sheffield (England)
HUMAN BODY DIMENSIONS: BODY OUTLINES AND ENVELOPE CURVES AT DIFFERENT NORMAL POSITIONS AND MOVEMENTS
May 1985 7 p Transl into ENGLISH from Deut Inst fuer Normung (West Germany), v 33, no 402, pt 3 6 p
(HSE-TRANS-10866, DIN-33-402-PT-3, FNERG-AA2-1-84) Avail NTIS HC A02/MF A01

Illustrated examples of human body outlines in the basic positions of standing, sitting, kneeling and lying down on the back are given There are also body outlines showing possible arm, leg, head and rump movements in these positions Some figures are shown dressed heavily in black They represent a lightly dressed person 1865 mm in height (20-25 year old males) of the 95th percentile in the basic positions of standing, sitting, kneeling and lying on the back The illustrations also show arm, leg, head and rump movements in these basic positions and these are illustrated by thin broken lines The user of this standard shall bear in mind that both heavy and light clothing restricts movement and that the envelope curves designate outreach when arm, hand, and finger zones are fully stretched The human body outline in the standing posture is determined not only by physical dimensions but also by very slight corrective movements made to maintain balance and to tense and relax the muscles R J F

N85-31830 National Physical Lab , Teddington (England) Div of Quantum Metrology
INDIVIDUAL OBSERVER DATA FOR THE 1955 STILES-BURCH 2 DEG PILOT INVESTIGATION
P W TREZONA Jul 1984 34 p refs
(NPL-QU-68, ISSN-0309-3050) Avail Issuing Activity

Data from 10 observers (5 male) aged between 20 and 53, with normal color vision, for a field subtending 2 deg at the pupil, are presented The data were used to derive mean color matching functions, unit coordinates, and relative luminous efficiency functions Author (ESA)

N85-31831*# National Aeronautics and Space Administration Ames Research Center, Moffett Field, Calif
THE USE OF SUPEROXIDE MIXTURES AS AIR-REVITALIZATION CHEMICALS IN HYPERBARIC, SELF-CONTAINED, CLOSED-CIRCUIT BREATHING APPARATUS
P C WOOD (San Jose State Univ , Calif) and T WYDEVEN May 1985 61 p refs
(Contract N61131-83-MP-30015)
(NASA-TM-86709, REPT-85193, NAS 1 15 86709) Avail NTIS HC A04/MF A01 CSCL 06K

In portable breathing apparatus applications at 1 atm, potassium superoxide (KO2) has exhibited low-utilization efficiency of the available oxygen (O2) and diminished carbon dioxide-(CO2) scrubbing capacity caused by the formation of a fused, hydrated-hydroxide/carbonate product coating on the superoxide granules In earlier work, it was discovered that granules fabricated from an intimate mixture of KO2 and calcium superoxide, Ca(O2)2, did not exhibit formation of a fused product coating and the utilization efficiency with respect to both O2 release and CO2 absorption was superior to KO2 granules when both types of granules were reacted with humidified CO2 under identified conditions In the work described here, single pellets of KO2, KO2/Ca(O2), mixtures and commercially available KO2 tables and granules were reacted with a flow of humidified CO2 in helium at 1- and 10-atm total pressure and at an initial temperature of 40 C In the 1-atm flow tests, the reaction rates and utilization efficiency of the KO2/Ca(O2)2 pellets were markedly superior to the KO2 pellets, tablets, and granules when the samples were reacted under identical conditions However, at 10 atm, the rates of O2 release and CO2 absorption, as well as the utilization efficiencies of all the superoxide samples, were one-third to one-eighth of the values observed at 1 atm The decrease in reaction performance at 10 atm compared to that at 1 atm has been attributed principally to the lower bulk diffusivity of the CO2 and H2O reactants in helium at the higher pressure and secondarily to the moderation of the reaction temperature caused by the higher heat capacity of the 10-atm helium Author

N85-31832*# National Aeronautics and Space Administration, Washington, D C
ERGONOMIC PROBLEMS REGARDING THE INTERACTIVE TOUCH INPUT VIA SCREENS IN ONBOARD AND GROUND-BASED FLIGHT CONTROL
K P HOLZHAUSEN and K P GAERTNER Jun 1985 22 p refs Transl into ENGLISH of "Ergonomische Probleme der Interaktiven Beruehreingabe ueber Bildschirme bei der Bord- und Bodenseitigen Flugfuehrung" Hamburg, Deutsche Gesselschaft fuer Ortung und Navigation, Oct 1978 p 1-18 Transl by Kanner (Leo) Associates, Redwood City, Calif
(Contract NASW-4005)
(NASA-TM-77814, NAS 1 15 77814) Avail NTIS HC A02/MF A01 CSCL 05H

A significant problem concerning the integration of display and switching functions is related to the fact that numerous informative data which have to be processed by man must be read from only a few display devices A satisfactory ergonomic design of integrated display devices and keyboards is in many cases difficult, because not all functions which can be displayed and selected are simultaneously available A technical solution which provides an integration of display and functional elements on the basis of the highest flexibility is obtained by using a cathode ray tube with a touch-sensitive screen The employment of an integrated data input/output system is demonstrated for the cases of onboard and ground-based flight control Ergonomic studies conducted to investigate the suitability of an employment of touch-sensitive screens are also discussed B W

N85-31833# Oak Ridge National Lab , Tenn
MANIPULATORS IN TELEOPERATION
W R HAMEL 1985 6 p Presented at the Executive Conf on Remote Operations and Robotics in the Nucl Ind , Pine Mountain, Ga , 21 Apr 1985
(Contract DE-AC05-84OR-21400)
(DE85-010563, CONF-850425-1) Avail NTIS HC A02/MF A01

Teleoperated manipulators represent a mature technology which has evolved over nearly 40 years of applications experience The wide range of manipulator concepots developed thus far reflect differing applications, priorities, and philosophies The technology of teleoperated manipulators is in a rapid state of change (just as are industrial robotics) fueled by microelectronics and materials advanced Large strides in performance and dexterity are now practical and advantageous Even though improved controls and sensory feedback will increase functionality, overall costs should be reduced as manipulator fabrication and assembly labor costs are reduced through improved manufacturing technology As these advances begin to materialize, broader applications in nonnuclear areas should occur DOE

N85-31834# Research Inst of National Defence, Umea (Sweden)
A PROTOTYPE TEST CHAMBER FOR FIT TESTING OF PROTECTIVE MASKS IN THE FIELD
B BURSTROEM, K DAHLGREN, L HAEGGLUND, and G LINDBERG Dec 1984 17 p refs In SWEDISH, ENGLISH summary
(FOA-C-40208-C1(C2), ISSN-0347-2124) Avail NTIS HC A02/MF A01, Research Institute of National Defence, Stockholm KR 50

A qualitative fit test of full face protective masks was accomplished in a 4 5 cum tent test chamber, filled with a tear gas aerosol at a generated concentration of 200 mg/cum Exposure to the aerosol can be achieved by openings in the tent A 2 min test program ascertains an acceptable fitting Up to 90 tests/hr can be performed Author (ESA)

N85-31835# Societe Nationale Industrielle Aerospatiale, Paris (France)
THE BLIND AND THE PARALYZED. THE NOTION OF THE TOOL REVEALED AND INTEGRATED IN A DIFFERENT ORGANIZATION ENVIRONMENT [LAVEUGLE ET LE PARALYTIQUE OU LA NOTION DOUTIL REVELEE ET INTEGREE DANS UN AUTRE CONTEXTE DORGANISATION]
P MARCHAND 1985 11 p refs In FRENCH, ENGLISH summary Presented at AICET Develop des Sci et Prat de lOrgan , Gif-sur-Yvette, France, 21-23 Nov 1984
(SNIAS-851-422-104) Avail NTIS HC A02/MF A01

The interactions between man and his tools in a socially complex environment are presented The main concepts developed include tools reveal a two fold language which stems from the insertion of the tool itself, the tool reflects to man a part of his own illusions, the machine being translates in the best way the present status of the tool, when it links anthropology to physics, these portraits and relations to man imply the mandatory conditions for a recursive organization Author (ESA)

N85-31836# Research Inst of National Defence, Stockholm (Sweden)
HUMAN FACTORS ENGINEERING CONTRACTS IN SWEDEN: AN OVERVIEW
H FURUSTIG Dec 1984 72 p In SWEDISH, ENGLISH summary Sponsored by National Defence Research Institute and Swedish Work Environment Fund
(FOA-C-56043-H2, ISSN-0347-7665) Avail NTIS HC A04/MF A01

Mapping of human contacts in Sweden, and an inventory of important sources of human factors data, are reported Impressive human factors resources in Sweden are identified Building up effective contact networks may decrease unnecessary duplication of work Universities, institutes and centers, research authorities, supervising and regulating authorities, consultants and societies are covered Author (ESA)

N85-31837# Research Inst. of National Defence, Linkoeping (Sweden)
HUMAN FACTORS ENGINEERING DATA SOURCES; AN OVERVIEW
H FURUSTIG Dec 1984 32 p In SWEDISH, ENGLISH summary Sponsored by Research Institute of National Defence and Swedish Work Environment Fund
(FOA-C-56044-H2, ISSN-0347-7665) Avail NTIS HC A03/MF A01

Mapping of human factors contacts in Sweden, and an inventory of important sources of human factors data are reported Checklists, textbooks, handbooks, and a list of foreign and Swedish journals treating human factors engineering are listed Swedish and foreign standardization authorities are mentioned Author (ESA)

N85-31838# Health and Safety Executive, Sheffield (England).
PHYSICAL DIMENSIONS OF HUMANS, VALUES, ENVELOPE CURVES IN DIFFERENT POSTURES
May 1985 9 p Transl into ENGLISH from Deut Inst fuer Normung (West Germany), v 33, no 402, pt 4, suppl 4 8 p
(HSE-TRANS-10869, DIN-33-402-PT-4-SUPPL-4, FNERG-AA2-6-79, FNERG-AA10-11-79) Avail NTIS HC A02/MF A01

Examples of human envelope curves at the place of work are intended to give practical assistance to the design world The examples given relate to the envelope curve of a human being 186 7 cm tall (i e , a male of the 95th percentile In addition to the various envelope curves produced by the various body postures, other factors in the field of ergonomics are also important when designing working systems These factors are discussed Author

55

PLANETARY BIOLOGY

Includes exobiology, and extraterrestrial life

A85-40407* Salk Institute for Biological Studies, San Diego, Calif
TEMPLATE-DIRECTED SYNTHESIS OF NOVEL, NUCLEIC ACID-LIKE STRUCTURES
A W SCHWARTZ and L E ORGEL (Sack Institute for Biological Sciences, San Diego, CA) Science (ISSN 0036-8075), vol 228, May 3, 1985, p 585-587 refs
(Contract NGR-05-067-001)

In studying the origins of life, it is important to examine reactions of substrate mixtures that could plausibly have accumulated on the primitive earth Nucleoside diphosphates would probably have been synthesized along with the standard nucleotides under prebiotic conditions For these reasons, the template-directed reactions of activated derivatives of these diphosphates, alone or mixed with activated nucleotides, were investigated An activated derivative of deoxyguanosine 3',5'-didphosphate condensed efficiently on a polycytidylate template to give oligonucleotide analogous in which each 3,5'ophosphodiester bond was replaced by a pyrophosphate linkage Oligomers were formed even in the absence of a template, but much more slowly Template-directed condensation occurred also with an analogous deoxadenosine derivative on polyuridylic acid and with an analogous acycloguanosine derivative on polycytidylic acid Author

A85-40788
GENESIS ON PLANET EARTH: THE SEARCH FOR LIFE'S BEGINNING (2ND EDITION)
W DAY (Iowa, University, Iowa City) New Haven, CT, Yale University Press, 1984, 316 p refs

The beginning of life on the primordial earth is discussed The topics addressed include the early earth, life before the Precambrian, the age of procaryotes, the advance of the eucaryotes, life's cellular nature, molecular architecture, the molecular basis of life, and archaebactena Also considered are energetics, the search for the building blocks, nucleosides, nucleotides, and ATP, polypeptides, enzymes, gene splinting, cellular envelopes, the emergence of cells, organic compounds in the universe, and the Gaia hypothesis C D

A85-41697
A FURTHER CONTRIBUTION TO THE INTERPRETATION OF THE VIKING BIOLOGICAL EXPERIMENTS [ESHCHE K VOPROSU OB INTERPRETATSII BIOLOGICHESKIKH EKSPERIMENTOV KOSMICHESKOGO APPARATA 'VIKING']
A V GARBUZ, L M MUKHIN, S L ORLOV, and A I SHAFIEV
Kosmicheskie Issledovaniia (ISSN 0023-4206), vol 23, May-June 1985, p 486-488 In Russian

Laboratory results are reported which are found to confirm the validity of a certain hypothesis concerning the results of the Viking biological experiments on Mars Specifically, it is argued that all the results of the biological experiments can be explained by the fact that significant quantities of radiation defects of different nature accumulate on the Martian surface due to the rarefied atmosphere The interaction of these defects with added solutions leads to the release of those gases which were detected during the Viking experiments B J

A85-41903
WEAK NEUTRAL CURRENT AND BETA RADIOLYSIS EFFECTS ON THE ORIGIN OF BIOMOLECULAR CHIRALITY
R A HEGSTROM (Wake Forest University, Winston-Salem, NC)
Nature (ISSN 0028-0836), vol 315, June 27, 1985, p 249, 250 refs

Rate equations are defined to estimate the asymmetric decomposition of racemic mixtures by beta radiation The asymmetry of enantiomer decomposition will depend on the beta ray source strength, the irradiation interval and the temperature Beta radiolysis is found to be potentially six times as effective as the effects of weak neutral currents, even in chiral molecules with heavy atoms Beta radiolysis may, then, have been the dominant symmetry-breaking autocatalyst in prebiotic epochs M S K

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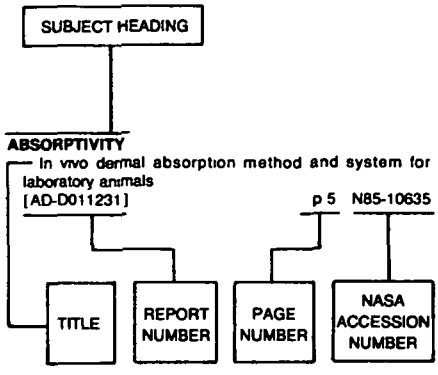

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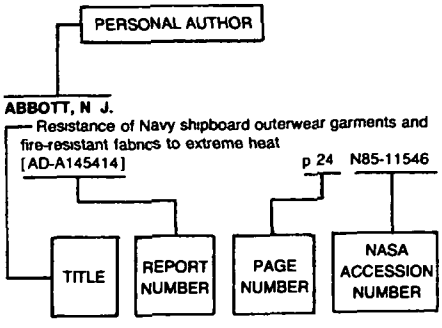

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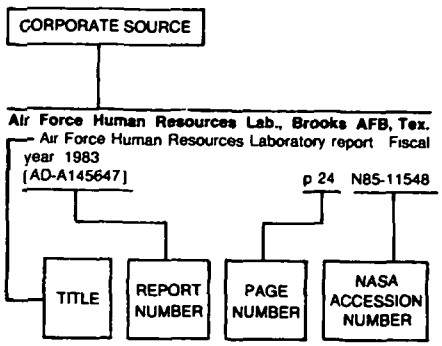

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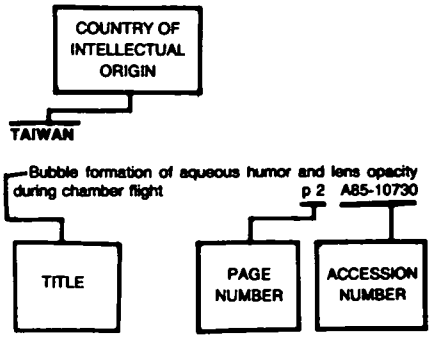

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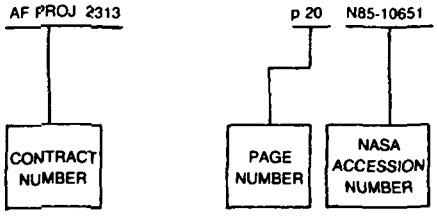

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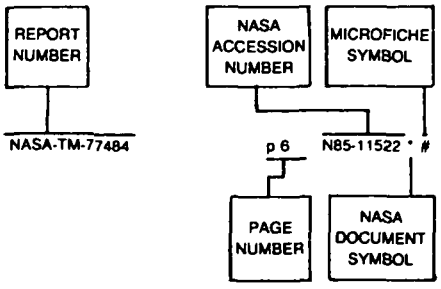

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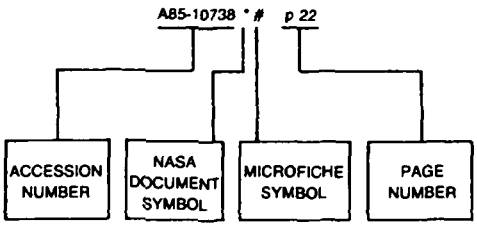

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Aerospace Medicine and Biology Continuing Bibliography (Supplement 277)	November 1985
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